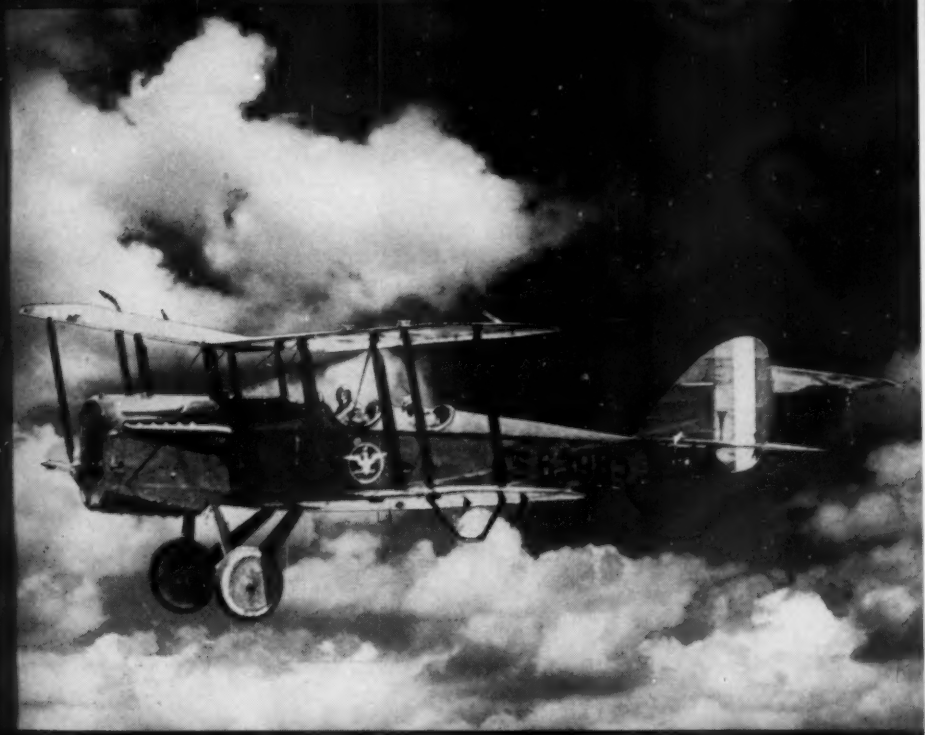
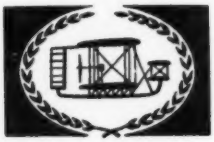
AIR POWER



VOLUME IV • NUMBER 2 APRIL 1950

THE AIR FORCE HISTORICAL FOUNDATION

THE AIR FORCE HISTORICAL FOUNDATION



The Air Force Historical Foundation, established in 1953, is an independent, incorporated body, operating under the sanction of law as a nonprofit organization

The Foundation is dedicated to the preservation, perpetuation and appropriate publication of the history and traditions of the United States Air Force and its predecessor organizations, and of the men whose lives have been devoted to that Service.

The business and objectives of the Foundation are educational and literary; to preserve the annals of American air power, especially the annals of the United States Air Force, its components, subsidiaries and affiliates, and of the individuals of whom they are composed; to disseminate to the public and to posterity accurate and complete historical information on air power subjects; and to preserve in a central repository significant materials depicting the history, culture, and traditions of the United States Air Force and the organizations which preceded it.

The government of the Foundation is vested in a board of twenty-four elected trustees, who serve a four-year term, and the following persons who are ex-officio members: The civilian head of the United States Air Force; the military head of the United States Air Force and his immediate predecessor; the commander of the Air University and the superintendent of the Air Force Academy.

Election of trustees is by ballot and each member of the Foundation is eligible, and is invited, to vote for members of the Board.

The Foundation is maintained wholly by individual subscriptions and contributions. Civilians and military alike are invited to join one of the following categories of membership:

1. Annual	$3.00
2. Life	$100.00
3. Contributing	$100.00 (annually)
4. Patron Life	$1000.00 to $5000.00
5. Benefactor Life	$5000.00 or above

(All contributions are deductible from income tax.)

All members receive the quarterly publication, "The Air Power Historian," whose guiding editorial policy is the belief that our civilization cannot survive if the peoples who enjoy its blessings display weakness in conviction and courage.

HISTORY — CULTURE — TRADITION

THE AIR POWER HISTORIAN

VOLUME IV • NUMBER 2 • APRIL 1957

THE AIR FORCE HISTORICAL FOUNDATION

OFFICERS

President
Maj. Gen. Benjamin D. Foulois (Ret)
1st Vice President
Lt. Gen. Idwal H. Edwards (Ret)
2nd Vice President
Major Alexander P. deSeversky
3rd Vice President
Mr. Gill Robb Wilson
Treasurer
Maj. Gen. St. Clair Streett (Ret)
Secretary
Lt. Gen. Dean C. Strother
Executive Director
Maj. Gen. Orvil A. Anderson (Ret)

BOARD OF TRUSTEES

Maj. Gen. James E. Briggs
Maj. Gen. R. L. Copsey (Ret)
The Hon. James H. Douglas
Lt. Gen. Ira C. Eaker (Ret)
Lt. Gen. Idwal H. Edwards (Ret)
Maj. Gen. Benjamin D. Foulois (Ret)
Lt. Gen. Robert W. Harper (Ret)
Gen. George C. Kenney (Ret)
Lt. Gen. William E. Kepner (Ret)
Brig. Gen. T. DeWitt Milling (Ret)
Lt. Gen. Richard E. Nugent (Ret)
Brig. Gen. Hume Peabody (Ret)
Mr. Robert Proctor
The Hon. Donald A. Quarles
Maj. Alexander P. deSeversky
Dr. Albert Simpson
Maj. Gen. Jacob E. Smart
Mr. C. R. Smith
Brig. Gen. Dale O. Smith
Gen. Carl A. Spaatz (Ret)
Lt. Gen. C. B. Stone III
Mr. James H. Straubel
Maj. Gen. St. Clair Streett (Ret)
Lt. Gen. Dean C. Strother
Gen. Nathan F. Twining
Mr. C. V. Whitney
Mr. Gill Robb Wilson

EDITORIAL BOARD

Dr. Albert F. Simpson, Chief
USAF Historical Division, Chairman
Major Alexander P. deSeversky
Dr. Eugene M. Emme, Air War College
Dr. Marvin W. McFarland, Library of Congress
Ramsey D. Potts

CONTENTS

51 **THE BOMBING OF THE BATTLESHIPS**
Brigadier General William Mitchell

66 **LEAVES FROM MY BATTLE-OF-BRITAIN DAIRY**
General Carl Spaatz, USAF (Ret)

76 **THE MEN AND THE MACHINES (Part III) April 1916—7 April 1917**
A Chronological Treatise on the Growth of Air Power

87 **AMERICAN DAY BOMBARDMENT IN WORLD WAR I**
Bruce C. Hopper

98 **A WAR DIARY (Part III)**
Lieutenant Roland R. Birnn

105 **SOME IMPACTS OF CHANGE**
Major General Orvil A. Anderson, USAF (Ret)

108 **AIRMAN'S BIBLIOGRAPHY**

114 **NEWS ITEMS**

It is the policy of *The Air Power Historian* neither to endorse nor subscribe to the views expressed in the articles it presents. Many events in history must perforce remain controversial by reason of the multiplicity of interpretations given these events by those who participated in them, or have studied them from hindsight.

Published by **The Air Force Historical Foundation,** Maxwell Air Force Base, Montgomery, Alabama
Annual Subscription $3.00 Issued Quarterly
Second-Class Mail privileges authorized at Montgomery, Alabama.

Copyright © 1957 by—
THE AIR FORCE HISTORICAL FOUNDATION

The Commanding General reviews and inspects the First Provisional Air Brigade at Langley Field, Virginia, June 18, 1921. Fourth from the right is Major Thomas.

LIBRARY OF CONGRESS

THE

Memo
From:
Chi
Subje
the
La
tion
192
ing
and
the
Th
tail, s
in th
traini
coun
Brig
ever
its ef
bene
of th
tion
and
shou
Th

LIBRARY OF CONGRESS

THE BOMBING of the *Battleships*

By BRIGADIER GENERAL WILLIAM MITCHELL

One of the pivotal events in the history of military aviation was the sinking in July 1921 of the former German battleship OSTFRIESLAND *by a handful of U. S. Army flyers commanded by the then Assistant Chief of Air Service, General Billy Mitchell. The destruction of a great capital ship, the pride of the Kaiser's navy, an "unsinkable" dreadnought, demonstrated the capabilities of air power in a way which the use of the airplane on the battlefields of France and behind the German lines in World War I had failed somehow to do. Hailed in the press of the day as "the bomb heard round the world," the achievement of Mitchell's 1st Provisional Air Brigade marked in dramatic fashion the epochal change which the airplane had brought in the conduct of war and the concept of national defense. Armies and navies would never be quite the same again.*

Hardly was the operation over than Mitchell assembled and submitted an exhaustive 442-page report to the War Department. As was to be the case with many another Mitchell report and recommendation, the great document went quietly into the oblivion of the official War Department files. Despite demands by the public and by members of Congress, the report was never published, though the non-committal, platitudinous findings of the Joint Army-Navy Board were widely circulated. The highlights of the covering memorandum and the report on the sinking of the battleships by General Mitchell are here published for the first time—thirty-six years after the event.

The Commanding General reviews and inspects the First Provisional Air Brigade at Langley Field, Virginia, June 18, 1921. Fourth from the right is Major Thomas.

August 29, 1921.

Memorandum for Chief of Air Service:

From: Brig. Gen. Wm. Mitchell, Ass't Chief of Air Service

Subject: Report on the operations of the First Provisional Air Brigade, Langley Field, Va., from its formation during the latter part of April 1921 until the ending of the bombing exercises against naval vessels, and the subsequent air raids along the Atlantic coast in August 1921.

The report treats all matters in detail, so that it may be used as a guide in the organization, formation, and training of future Air Forces in this country. The First Provisional Air Brigade was the first real Air Force ever in being in the United States; its efficiency is a matter of record. The benefit to the country, to the personnel of the Air Service, and the demonstration of aerial activities to the Army and Navy is so important that they should be continued every year.

The conclusions drawn from the exercises are as follows:

1. Air Forces, with the types of aircraft now in existence or in development, acting from shore bases, can find and destroy all classes of seacraft under war conditions, with a negligible loss to the aircraft. It is not necessary to destroy hostile seacraft at a distance greater than 25 miles off shore in order to protect the coast, as this distance exceeds the range of the most powerful guns at present installed. Aircraft acting from suitable floating airdromes can destroy any class of surface seacraft on the high seas.

2. Conditions of weather affecting air and sea conditions do not alter the statement made above, as aircraft can operate under conditions under which seacraft cannot operate. For instance, a sixty-mile wind, low visibility near the water, and operations at night are very difficult for seacraft. There are no conditions in which seacraft can operate efficiently in which aircraft cannot operate efficiently. Aircraft, therefore, form an absolutely positive

system of defense against seacraft within the radius of their action.

3. The weapons used in the recent exercises against the seacraft were bombs alone. Torpedoes, gas, gunfire, and mines were not used. The Army Air Service was not permitted to attack the targets as it would under actual conditions; and never was more than one tenth of the First Provisional Air Brigade employed in a single attack. Had the Army Air Service been permitted to attack as it desired, none of the seacraft attacked would have lasted ten minutes in a serviceable condition. The First Provisional Air Brigade could have put out of action the entire Atlantic Fleet in a single attack. The money value of the airplanes in the First Air Brigade did not exceed the cost of a modern destroyer.

4. Seacraft are much more vulnerable when they have steam up in their boilers, are moving at a high speed in formation, and when they are equipped with ammunition in their magazines and on their decks. A comparatively small bomb will cripple their condenser systems, throw their rudders and propellers out of line, and completely demoralize the operating personnel. The naval officers and enlisted men that watched the *Ostfriesland* roll over and sink will never forget it, and they fully realize the tremendous moral effect that an air attack possesses.

5. The problem of the destruction of seacraft by Air Forces has been solved, and is finished. It is now necessary to provide an air organization and a method of defending not only our coast cities, but our interior cities, against the attack of hostile Air Forces. Our recent maneuvers show that an enemy having control of the air—which gives him control of the sea—may land Air Forces from airplane carriers on any of the islands or keys along our coast, which cannot be attacked by troops or artillery; and from those points launch air attacks against our great centers of population in the triangle, Chesapeake Bay, Boston, and Chicago. Within two days after a theoretical landing had been made, at a point eight miles north of Cape Hatteras, our First Provisional Air Brigade attacked Richmond, Newport News, Norfolk, Washington, New York, Philadelphia, Wilmington, and Annapolis; this being done with comparatively crude equipment. With improved equipment, attacks may be expected from hostile Air Forces over our northern frontier, East Coast, or the Gulf of Mexico, against great cities in the center of the country, such as Chicago, St. Paul, Omaha, and Kansas City; and also against our great cities on the Pacific Coast. Gas, explosive, and incendiary bomb attacks against these centers will completely cripple them, kill thousands of people, demoralize transportation systems, and make it impossible for any great military movements or operations to take place in this country.

6. Our scheme of national defense should be revised at once. It should be based on the following principles:

a. An Air Force should be provided as a means of frontier and coast defense, both against seacraft and against aircraft. For fighting against aircraft, all means of defense against aircraft should be attached to the Air Force.

b. A Navy should be organized and equipped to take the offensive on the high seas, and not be employed along and close to the coast. Such air forces should be assigned to the Navy as can go to sea with it and fight with it on the high seas.

c. Navy control so far as it affects coast defense should cease 200 miles from the coast. Complete

control and responsibility for the defense of the land should reside in the Army, and it should be organized to accomplish this mission. A Navy driven from the high seas must be protected by the Air Force and the Army.

d. At present there is a complete lack of liaison or system about our national defense. The duties are distributed between the Army, the Navy, the Air Forces, the Coast Artillery, the Army Corps Area Commanders, and the Coast Guard in such a way as to make it impossible to function efficiently in an emergency. It is a heritage of our early wars. Former experiences show that it is impossible under the present system of departmental organization of separate War and Navy Departments to obtain an efficient solution of our needs for national defense; there is no common head —except Congress—where matters relating to land defense, sea defense, and air defense can be submitted on their own merits and judged as a force by itself. Aviation can only be developed to its fullest extent under its own direction and control. An efficient solution of our defensive needs will not exist until a Department of National Defense is organized, with a staff common to all the services. Sub-secretaries for the Army, for the Navy, and for the Air must be created. At the present time our aeronautic efforts are dissipated from an inefficient system of command, an inefficient method of handling personnel, and an inefficient system of the distribution of the funds appropriated for national defense. In the last ten years, $1,870,000,000 has gone into the creation and maintenance of our Coast Artillery and coast defense. What defense is this against hostile sea forces or against hostile air forces? Millions of dollars have been spent for Navy yards distributed along the seacoasts, few of which have depth of water sufficient to accommodate a wounded battleship limping into port drawing forty or forty-five feet of water. An infinitesimal part of the money which we can save from these useless expenditures, devoted to the creation of an Air Force, would protect our coast against any enemy either in the air or on the water.

e. As long as our Air Forces remain a part of the Army and Navy, no aerial defense of this country commensurate with the expenditure of effort and money made is possible. A Department of Aeronautics coequal with the Departments of War and Navy should be created at once, charged with the development of an Air Force and its auxiliaries. Only then will there result real national protection combined with economy.

REPORT OF THE OPERATIONS OF THE FIRST PROVISIONAL AIR BRIGADE IN NAVAL ORDNANCE TESTS

Chapter I—Initiation of the Project

Previous to the bombing tests conducted during the summer of 1921, there had been too few examples of the attack of warships by airplanes to warrant the drawing of conclusions from these alone. However, a consideration of the characteristics of the two—the relative speed of airplane and battleship, the utter vulnerability of the battleship to attacks from above, the futility of attempting to conceal seacraft—led those who had given the subject much study to come to the definite conclusion that seacraft in war lay utterly at the mercy of airplanes. This view was upheld by Brigadier General William Mitchell in hearings

before a committee of Congress in 1920, in which he urged that the matter be put to a test. With this end in view, the Secretary of War requested the Secretary of the Navy, on February 1, 1921, that a battleship be turned over to the Army Air Service in order that a series of tactical experiments might be conducted.

From the experience gained in the World War, a definite doctrine of air warfare over land had been arrived at. This doctrine states the absolute necessity of gaining control of the air, which could be accomplished only by preponderance of pursuit aviation, before air operations could be conducted with decisive results. It required no deep study of the subject to perceive that this principle holds true whether the air fighting occurs over land or over water. In the attack of seacraft, therefore, the chief matters to be determined were the size and kind of bombs necessary to put a ship out of action, the means necessary to sink seacraft of various kinds, the best methods of vitiating anti-aircraft defense, and the most suitable formations for attack. It was anticipated that much would be learned in regard to these matters from the experiments conducted on the battleship.

However, from one cause or another, considerable delay occurred in turning over the battleship to the Army Air Service. A ship was selected for this purpose, but after further consideration the Navy Department determined to retain this battleship for purposes of their own. A second ship was then determined on—the *Alabama*—but delay after delay occurred here also and to date no ship has been turned over to the Army for this purpose, although the *Alabama* had been promised by September 1, 1921.

Meanwhile, the Navy Department had determined on a series of tests of their own, involving the destruction of the ex-German warships. These tests were in no way designed to bring out tactical lessons, but were to be ordnance tests pure and simple. Airplanes were not to be permitted to execute mass attacks, as would be done in war with a view to destroying the hostile seacraft, but they were to be limited to a small number of bombs in order that data might be obtained as to the effect of these bombs on various types of seacraft. In each case, provision was made that the ship should be sunk by gunfire or static charges in case the small number of bombs allowed should fail to sink her. The Army Air Service was invited to participate in these ordnance tests, in conjunction with the Naval Air Force, and accepted the invitation. In a preliminary conference between officers of the two forces, the conditions of the test were laid down by the Commander-in-Chief, Atlantic Fleet. Certain recommendations were made by the Army members with a view to rendering the tests of greater tactical value. It was pointed out, however, that the tests did not contemplate this and were for ordnance purposes alone. On this basis, an agreement as to the conduct of the tests was arrived at and embodied in the instructions of the Commander-in-Chief, Atlantic Fleet. . . .

Meanwhile, a great deal of preliminary work had been done throughout the Air Service. At practically every Air Service field where tactical units were stationed, bombing was begun with dummy bombs, and much primary training had been accomplished before the definite approval for the project and for the organization of a unit to carry it out had been obtained. A great deal of attention was given by all to the work of bombing training, and at the Field Officers School in particular study was directed toward

the best method of attacking seacraft. Simultaneously with the regular course of the Field Officers School, which occupied the mornings, experimental training in bombing was conducted for the instructors and students . . . in the afternoons.

On April 23, 1921, the Chief of Air Service informed the Commanding Officer, Langley Field, that the project had received the approval of the War Department and directed that the preliminary work for the organization of a Provisional Air Brigade be undertaken. Major T. D. Milling, Officer-in-Charge, Field Officers School, was designated to command this Brigade.

Chapter II—Organization of the First Provisional Air Brigade

The Chief of Air Service, in a letter to the Adjutant General of the Army, dated March 15, 1921, . . . had made certain recommendations as to the tentative organizations which would be necessary in the carrying out of the operations. . . . The recommendations were approved and, under date of April 20, 1921, the Commanding Officer, Langley Field, Virginia, was directed to issue orders covering the organizations of a Provisional Air Brigade, and Special Orders No. 98, Headquarters, Langley Field, Virginia, . . . provided for the tentative formation of this organization, which was to have as a nucleus certain of the personnel, both enlisted and commissioned, of Langley Field, augmented by such personnel as might be transferred there from other stations.

Major Thomas D. Milling, A. S., was designated to command the Brigade. However, it was contemplated that when the preliminary organization and training had been instituted, the Assistant Chief of Air Service, Brigadier General William Mitchell, would be ordered to Langley Field to assume permanent command. . . .

Though the operations called for by the Commander-in-Chief, Atlantic Fleet, were purely ordnance tests, yet it was necessary for the Brigade to seize the opportunity to secure all possible tactical training in the carrying out of operations in order that the Army Air Service might realize, to the greatest possible advantage, upon the expenditure of funds which would be necessary in the carrying out of [the] project. . . .

On May 27, 1921, Brigadier General William Mitchell assumed command and the Brigade was reorganized in compliance with General Orders No. 4, and the channels of administration and operation were shown by blueprints which were issued this date. . . . Between the date of the original organization of the Brigade and May 27, 1921, the different staff sections had been organized, equipment and personnel had been concentrated, and primary training had been completed.

While the different phases of [the] project as covered by the orders of the Commander-in-Chief, Atlantic Fleet, were to be initial operations in the history of the Air Service of aircraft versus seacraft, it had been determined that such operations presented no essentially new features. Brigadier General William Mitchell had already gone upon record with the claim that such attacks were entirely feasible and that seacraft in general were particularly vulnerable to attacks from the air. With his remarks and observations as a guide, it was determined that a doctrine of the attack of seacraft from the air would proceed along the same lines as the attack of a target on the ground; that is, lanes of approach must be cleared of hostile aircraft, while the decks and superstructure must be cleared by light bombing attacks with

gas and fragmentation bombs.

This primary operation was essentially a function of the pursuit branch of aviation, and no further bombing operations could be conducted until the primary control of the air and the clearing of anti-aircraft defenses had been attained. After the pursuit aviation had accomplished their mission, the remainder of the operation was comparatively simple, consisting of attacks by light and heavy bombing planes.

The only new feature in the attack of seacraft would be found in the effect of our heavier bombs exploded along the side of the vessel attacked. It was the contention of the Commanding General that such hits would be more effective than a bomb striking directly upon the target; and, as later events proved, this theory was correct, and in the attack of a battleship by aerial forces the latitude of vulnerability was shown to be far in excess of the original estimate. . . .

Chapter IX—The Attack of the ex-German Battleship "Ostfriesland," July 20 and 21, 1921

The ex-German battleship *Ostfriesland,* anchored fifty miles (nautical) off Cape Charles Lightship, bearing 62°. Identification marks: concentric red, white, and blue circles fore and aft.

Pursuant to instructions contained in Orders of the Commander-in-Chief, Atlantic Fleet, and Operations Orders No. 7, Air Force, Atlantic Fleet, and Addenda thereto, the attack of the ex-*Ostfriesland* was ordered as follows:

For July 20, 1921

Attack No.		Unit		Class of Bombs	No. of Bombs
1	8:30 A.M.	5 Martin bombers	(Navy)	14″ A.P.	5
		3 MB's	(Navy)	14″ A.P.	6
2	10:00 A.M.	5 DH-4's	(Marine)	230 lb.	10
		2d Div. 3 F-5-L's	(Navy)	230 lb.	12
		4th Div. 3 F-5-L's	(Navy)	230 lb.	12
3	11:30 A.M.	1st Div. 3 F-5-L's	(Navy)	550 lb.	6
		5th Div. 3 F-5-L's	(Navy)	550 lb.	6
4	1:00 P.M.	Martin bombers	(Army)	600 lb.	12
5	2:30 P.M.	Martin bombers	(Army)	1,100 lb.	14
6	5:00 P.M.	Martin bombers	(Navy)	1,000 lb.	8
		NC's	(Navy)	1,000 lb.	6

For July 21, 1921

1	When ordered	Martin bombers	(Navy)	2,000 lb.	3
2	When ordered	Martin bombers	(Army)	2,000 lb.	3

The participation of Army air units in these attacks is covered by Field Orders Nos. 12, 13, and 14, First Provisional Air Brigade. . . .

On the morning of July 20, weather conditions at the target were unfavorable for aviation—low visibility with clouds at one thousand feet and a rough sea. By 9:00 A.M., the visibility had improved and the clouds had lifted to two thousand feet. The sea was going down. However, at 10:40 A.M., the Commander, Battleship Division No. 5 (CBD-5), in charge of operations, gave the order to return to base, the exercise to be carried out on the following day.

At 11:35 A.M., CBD-5 signalled:

LIBRARY OF CONGRESS

Closeup of the "unsinkable" OSTFRIESLAND *riding at anchor off Hampton Roads, Virginia, July 18, 1921, three days before Mitchell's bombers sent her to the bottom.*

"Proceed with program omitting 1st attack." The 2d and 3d attacks were ordered to proceed to the target when ready. The first unit to appear at the target consisted of five Marine DH-4's, each carrying two 230-pound bombs. This unit made all attacks in formation at an approximate altitude of one thousand feet.

At 1:35 P.M., a run was made across the target dropping one sub-calibre sighting shot and one smoke bomb. At 1:40 P.M., the leading plane dropped one bomb—a dud—off the port side. At 1:46 P.M., three bombs, one direct hit aft of stacks, one port, and one dud starboard.

At 1:50 P.M., one direct hit dud, one just off port side amidships, one starboard side amidships.

At 1:55 P.M., three bombs, two off starboard side aft, one being a dud, one dud eight hundred feet astern.

Time first bomb dropped	1:35 P. M. Sighting shot
Time last bomb dropped	1:55 P.M.
Total time	20 minutes
Bombs dropped	10 230-pound
Direct hits	2
Duds	6
Total weight of bombs dropped	2,300 pounds

The attack by the Fourth Division of three naval F-5-L's was initiated at 2:06 P.M. when this Division crossed the target at one thousand feet altitude in close formation, dropping six 230-pound bombs. One direct hit was registered forward. Another direct hit amidships failed to explode. Three

bombs fifty feet off port bow and one dud off port stern deluged the ex-*Ostfriesland* with water.

At 2:13, this Division again crossed the target dropping six bombs, one just off port side, one off starboard, two hits amidships, both duds, and two off starboard stern, both duds.

Time first bomb dropped	2:06 P.M.
Time last bomb dropped	2:13 P.M.
Total time	7 minutes
Bombs dropped	12 230-pound
Direct hits	4
Duds	6
Total weight of bombs dropped	2,760 pounds

At 2:20 P.M., it was noticed that the ex-*Ostfriesland* had taken a slight list to port.

The attack by the Second Division of three Navy F-5-L's followed. This attack followed the tactics developed by the Army—that of column formation, each plane following in the leader's trace. The attack commenced at 2:34 P.M. and was completed at 2:52 P.M. No direct hits were registered, but three were placed within the danger zone, all being less than twenty-five feet off the sides.

Time first bomb dropped	2:34 P.M.
Time last bomb dropped	2:52 P.M.
Total time	18 minutes
Bombs dropped	12 230-pound
Direct hits	None
Duds	3
Total weight of bombs dropped	2,760 pounds

Upon the completion of the attack by the Second Division, the Board of Observers proceeded to make an examination of the damage sustained by the ex-*Ostfriesland*.

Pursuant to Field Orders No. 13, First Provisional Air Brigade, the first attack by Army units, consisting of Martin bombers Nos. 3, 17, 4, 2, with No. 14 in reserve, each carrying three 600-pound demolition bombs, left Langley Field at 1:36 P.M. They arrived at the target at 2:45 P.M., just before the Second Division had finished its attack. They were forced to wait in the vicinity of the target during the period covered by the inspection of the Observing Board.

In addition to the attacking forces, Army units engaged in the exercises consisted of airships C-2 and D-3 for observation and photographic work. The D-4 had proceeded to the target during the morning and had returned to base upon receipt of notification that the exercises had been postponed. Photographic planes, DH-4B's, were dispatched by the First Provisional Photo Section and five F-5-L's were dispatched by the First Provisional Surveillance Squadron for rescue work.

Brigadier General William Mitchell, piloting a DH-4B, observed the attack by Army Martins and the First and Fifth Divisions of naval F-5-L's.

During the inspection of the ex-*Ostfriesland* by the Observing Board, the First and Fifth Divisions of naval F-5-L's arrived at the target. Also signals were received from Norfolk and Langley Field that a terrific thunderstorm was raging and passing out to

sea. Therefore, upon the return of the Observing Board, all aircraft were signalled to expedite attack, no order of attack being specified for the three units then present.

Attack by Army Martin bombers.

Taking up the attack formation, the Martins flying at fifteen hundred feet proceeded to the attack at 3:42 P.M. The leader, No. 3, crossed the target but did not drop. No. 4 followed with two bombs. The attack continued for ten minutes, during which time eleven bombs were dropped, two registering direct hits, one of which was a dud, and four being within the danger zone just off the ship's sides. . . .

Time first bomb dropped	3:42 P.M.
Time last bomb dropped	3:52 P.M.
Total time	10 minutes
Bombs dropped	11 600-pound
Direct hits	2
Duds	2
Total weight of bombs dropped	6,600 pounds

Attacks by First and Fifth Divisions of Navy F-5-L's.

The attack by these units was commenced at 3:49 P.M., while Martins were still bombing and continued until 4:27 P.M. A total of eight 550-pound bombs were dropped from an altitude of eleven hundred feet. Two direct hits were scored, one being a dud and the other a low-order explosion. Two others were within the danger zone.

Time first bomb dropped	3:49 P.M.
Time last bomb dropped	4:27 P.M.
Total time	38 minutes
Bombs dropped	8 550-pound
Direct hits	2
Duds	3
Total weight of bombs dropped	4,400 pounds

Upon completion of this attack, operations were suspended for the day. The Board of Observers again inspected the ex-*Ostfriesland*. An unofficial statement was made to the effect that the ex-*Ostfriesland* was slowly taking water astern, the port engine room was flooded.

Orders were issued for Army and Navy attacks with 1,000-pound bombs to be at target at 8:00 A.M., and attacks with 2,000-pound bombs to be at target at 2:00 P.M.

The Board of Observers decided that as soon as one hit with 1,000-pound bombs was scored bombing with that weight of bomb would be discontinued; that the Army and Navy bombers would each be allowed to drop three 2,000-pound bombs.

In accordance with Field Orders No. 14, First Provisional Air Brigade, eight Martin bombers, Nos. 23, 21, 25, 26, 22, 15, 11, and 24, left Langley Field at 6:56 A.M. Army airships, photographic DH-4's, and Brigadier General William Mitchell piloting a DH-4B, also proceeded to the target.

The Martins taking up the attack formation passed over the target, beginning at 8:31 A.M., each plane dropping a sighting shot. At this time, the ex-*Ostfriesland* had ceased taking water

LIBRARY OF CONGRESS

Made at 8:39 A.M., July 21, 1921, this photograph shows the results of the attacks by the Martin bombers using 1,100-pound bombs—a direct hit near the forecastle, two direct hits near the stacks, one bomb in the water. These hits put the forward boiler rooms out of action and demolished the forced-draft system.

and was on an even keel with her stern down about three feet.

At 8:35 A.M., the flight leader in No. 23 crossed the target, making a direct hit on the forecastle. At 8:36 A.M., No. 21 dropped one bomb. At 8:26½ A.M., No. 11 scored the second direct hit near stacks, closely followed by No. 26. At 8:37 A.M., again a direct hit was scored near the stacks. At 8:39, No. 27 dropped the last bomb of the 1,000-pound attacks. At 8:35:30 or just as No. 23 scored the first hit, the "all-clear" signal was ordered taken, but due to speed with which attack was pressed four more bombs were dropped before signal had been removed.

All aircraft were then ordered to return to base, although the Army Martins still had nine bombs authorized to be dropped. The naval Martins and NC's, which were now in the vicinity of the target, were ordered to return to base and load with 14-inch armor-piercing projectiles.

Time first bomb dropped	8:31 A.M. Sighting shot
Time last bomb dropped	8:39 A.M.
Total time	8 minutes
Bombs dropped	5 1,100-pound
Direct hits	3
Total weight of bombs dropped	5,500 pounds

The Board of Observers again inspected the ex-*Ostfriesland* which by now, though not taking any additional water, had her forward boiler rooms put out of action and the forced-draft system demolished.

The final attack on the ex-German battleship by Army Martins, carrying 2,000-pound bombs, was delivered in accordance with Field Orders No. 14, First Provisional Air Brigade. Martin bombers Nos. 5, 2, 13, 14, 1, 4, 6, and 17, and Handley Pages Nos. 31, 32, and 37, took off at 10:55. Arriving at the target they proceeded to the attack in column formation, No. 5 leading the way, dropping a sighting shot at 12:15 P.M.

At 12:18½, No. 14 dropped the first two-thousand-pound bomb from an altitude of twenty-five-hundred feet, followed by No. 13 at 12:20⅓ P.M.

At 12:23, a sighting shot hit near the starboard waist turret.

At 12:24, No. 5 again crossing the target dropped a 2,000-pound bomb which hit the side armor a few feet aft of the bow on the port side, then glanced off and exploded in the water just alongside. This bomb would undoubtedly have sunk the *Ostfriesland*, as when it turned over water could be seen streaming out of several large holes in the side and bottom.

At 12:25, No. 17 scored a hit about twenty-five feet off the port side near the waist turret, followed at 12:28 by No. 4 scoring a hit about twenty feet off the port side aft of the waist turret. The force of the explosion of both of these bombs could be seen on the starboard side of the ex-*Ostfriesland*. Hundreds of tons of water were thrown on deck. She immediately started to sink by the stern and, at 12:31, No. 2 dropped one bomb two hundred feet off starboard side. By this time the stern was settling fast.

At 12:33 P.M., she took a heavy list to port.

At 12:36 P.M., stern disappeared.

At 12:39 P.M., started to turn over.

At 12:39:30 P.M., over.

At 12:40 P.M., disappeared.

The destruction was witnessed by Brigadier General William Mitchell, piloting a DH-4B. Just as the ex-*Ostfriesland* disappeared from sight, Handley Page No. 31 fired the final salute, a 2,000-pound bomb, striking fairly in the center of the spot where the ex-*Ostfriesland* had been anchored, thus bringing to a successful conclusion all attacks made by Army airmen against the ex-German vessels.

Time first bomb dropped	12:15 P.M.
Time last bomb dropped	12:40 P.M.
Total time	25 minutes
Bombs dropped	7 2,000-pound
Direct hits	2
Total weight of bombs dropped	14,000 pounds

Résumé

Number of attacks by Army	3
Number of attacks by Navy	2
Total number of planes, Army	16
Total number of planes, Navy	16
Total time consumed by Army attacks	43 minutes
Total time consumed by Navy attacks	83 minutes
Total number of bombs dropped, Army	23
Total number of bombs dropped, Navy	42
Total number, direct hits, Army	7
Total number, direct hits, Navy	8
Total number of duds, Army	2
Total number of duds, Navy	17
Total weight of bombs dropped by Army	26,100 pounds
Total weight of bombs dropped by Navy	12,220 pounds

Chapter X—Conclusions

The tests, as before stated, were essentially ordnance tests. Regarded from this point of view, the tests established beyond any shadow of a doubt that seacraft of all kinds, up to and including the most modern of battleships, can be destroyed easily by bombs dropped from aircraft; and, further, that by far the most effective means of destruction are bombs. At battle ranges for guns, bombs are more accurate and many times more effective than gunfire; indeed, it is very doutbful that gunfire could sink a vessel of the *Ostfriesland* type without the aid of internal explosions of magazines, whereas bombs not only put out of action but destroy utterly.

Unfortunately, these tests were not so conducted as to determine the thing that is, after all, the foremost consideration in battle, namely, what force is needed to put a ship out of action. To sink a ship is to carry the work of destruction to unnecessary lengths. For tactical purposes, in battle, it is enough to put the ship out of action by the destruction of her fire-control system, the jamming of hoists, the shock to human nerves, etc.—all of which could be accomplished and the ship rendered useless though still showing on the surface of the sea. There can be no doubt that many of the lighter bombs that had no perceptible effect on the target as viewed from the deck of another ship four thousand yards away would nevertheless have converted her from a fighting unit to a useless mass of floating steel. But, though these tests failed in this way to demonstrate facts of vital importance, they did show conclusively:

(a) That unarmored seacraft may be sunk by 300-pound bombs.

(b) That protected seacraft may be sunk by 600-pound bombs.

(c) That armored seacraft may be sunk by 2,000-pound bombs.

From these facts it is believed that we may accept as our doctrine the following:

(a) Naval craft will be put out of action by direct hits of 100-pound and 300-pound bombs.

(b) In war, the main attack should be made on seacraft with bombs as follows:

Unarmored seacraft: 100-pound, 300-pound, and 600-pound bombs.

Protected seacraft: 600-pound and 1,100-pound bombs.

Armored seacraft: 1,100-pound, 2,000-pound, and 4,000-pound bombs.

This doctrine we expect to demonstrate conclusively in the test on the *Alabama*.

Although these tests were not tactical in their object, nevertheless certain tactical features were brought out. Much had been said of the difficulty of operating land planes over the sea. This was shown to be a myth, pure and simple. During this operation, more than two hundred flights were made at sea, during which planes would travel approximately two hundred and fifty miles without sighting land. Nevertheless, not a life was lost, and every plane that started out from the mainland reached its objective, nearly a hundred miles at sea.

To a well-trained force, flying over the sea presents no more difficulties than flying over the land, and the location of targets and the conditions of visibility, the most important feature in bombing as in shooting, proved to be ease itself. It is true that, in this problem, destroyers were placed at intervals between the target and the shore. However, in many cases, conditions of lateral visibility rendered this aid useless: many trips were made by pilots who never sighted a destroyer but who arrived at the target nevertheless. The operation could be repeated with the same ease without the safeguard of the line of destroyers.

A considerable amount of misinformation appeared in the public prints in regard to the effect of weather. During the course of these opertions, there was no single day on which our airplanes failed to operate. At this season of the year, violent storms are of common occurrence: scarcely an afternoon passed without one or more of them in the theater of operations. On one occasion an entire flight came safely through a very severe one, only one plane being forced to land. It is worthy of note, too, that on one occasion, when our surveillance planes, sent out ahead to observe in accordance with our tactical method, reported weather conditions good for the operation, the naval air force commander considered conditions unsuitable and so reported. Conditions of wind and sea that make the operation of seacraft impracticable do not prevent the operation of aircraft.

In conclusion, it is desired to point out that an adequate defense of our coast line by aircraft against hostile invasion depends on four things:

(a) Our ability to locate the hostile fleet.

(b) Our ability to reach it before it arrives within striking distance of our shores.

(c) Our ability to overcome the hostile defenses to a sufficient extent to permit the launching of our attack.

(d) Our ability to drop bombs, torpedoes, etc., that will put out of action the hostile force.

The recent tests demonstrated beyond a doubt that, given sufficient pursuit to insure our domination of the air, given sufficient bombing planes—in short, an adequate air force—aircraft constitute a positive defense of our country against hostile invasion.

Chapter XI—Simulated Attack on New York

The possibility of hostile aircraft being landed upon our shores from airplane carriers and inflicting terrible

losses upon our coastal cities has been considered by the officers in charge of the American Air Service as one of vital importance to our national defense. During the manoeuvers conducted under the direction of the Joint Army and Navy Board, it was proven that aircraft can prevent ships from approaching our shores. It is possible for aircraft not only to find enemy ships while they are a great distance from shore, but it is also possible to bomb them and secure a high percentage of hits. However, should the enemy aircraft carriers succeed in getting through our aerial defenses, it would be very possible for them to establish landing fields at a great number of more or less isolated spots along the Atlantic seaboard, from which bases they could operate and destroy the great commercial and governmental centers of the United States.

In order to determine the radius of action of present-day equipment operating from such a base, and to ascertain whether or not it was dependable to be operated a great distance from the base, as well as to instruct the officer personnel of the Air Service in the theory and practice of bombing tactics, a nonstop flight was planned from Langley Field, at Hampton, Virginia, to New York City. In connection with this flight, it was also desired to familiarize the officers, who had been concentrated at Langley Field, with the Atlantic seaboard in order to increase their efficiency in case of a national emergency.

War conditions were simulated as nearly as possible. Orders were issued the night preceding the contemplated attack, and all machines were dispatched exactly on the minute. Seventeen Martin bombers, one Handley Page, and one Caproni composed the attacking force. They were ordered to proceed to New York via Atlantic City, bomb the business section, and then proceed to Mitchel Field and effect a landing at that place.

Machines formed without delay in a great V formation and proceeded to cross Chesapeake Bay and continued up the Cape Charles peninsula, roughly on a line parallel to the Pennsylvania Railroad, to the vicinity of New Church; from that point they proceeded by compass course to Cape Henlopen and crossed the Delaware Bay to Cape May, following along the west lands bordering the Atlantic Ocean to the vicinity of Ocean City; from which point the course was altered slightly to westward and the flight crossed over Atlantic City.

There were two reasons for doing this: one was to take advantage of the emergency landing fields at Cape May and Atlantic City in case any ship should be in trouble; and the other was to fly over an area where the population would be as scattered as possible in order that the alarm that the airplanes were approaching would not be given out.

From Atlantic City, the formation proceeded in a straight line to Sandy Hook, passing over Tom's River. From Sandy Hook the formation swung to the west and approached New York over Staten Island in order to give bombardiers an opportunity to check up on their drift and to pick up the direction and velocity of the wind before the attack on the city proper. The formation was then led across Brooklyn and directly over the Battery, up Wall Street and Broadway to approximately the southern end of Central Park, at which point the whole formation turned and proceeded to the south, again bombing the business districts of the city.

After this had been completed, the machines were formed again from bombing formation into cruising for-

mation and proceeded along the south end of Long Island directly to Mitchel Field, where all machines landed without an accident of any kind. The machines were refueled and could have proceeded on the return trip without delay.

On the return trip to Langley Field, war conditions were again simulated, and the machines were ordered to Philadelphia, Wilmington, Baltimore, and Annapolis. The formation left Mitchel Field and proceeded in a straight line directly to Philadelphia, arriving over the city one hour and fifty minutes after leaving New York. At Philadelphia, the formation broke into battle line and simulated bomb dropping. When the attack had been concluded, ships were again massed in cruising formation and proceeded to Wilmington and thence to Baltimore. Bombing attacks were simulated on both cities. Course was then altered directly to Annapolis. The formation swung over Annapolis and then broke into battle formation, made a short circle, and again passed over the Naval Academy and simulated bomb dropping. Signal to reform was given after all ships had passed over the target and the entire formation proceeded to Langley Field, where all the machines landed without difficulty.

In all, approximately seven hundred miles were covered without mishap. This proved conclusively that even with present-day equipment, unless adequate measures are taken, enemy planes could be landed on our shores and practically demolish the Atlantic seaboard cities in a period of a few days. The training value of the manoeuver to the personnel of the Air Service is incalculable.

Dr. Bell on Air Power

"Now, the United States has a great advantage, so far as future progress is concerned. We are an inventive people. In fact, the chief weapons of modern warfare used in Europe are American inventions, nearly all of them. We are an inventive people, and if we prepare in time we can develop these machines to greater and greater usefulness, and we will have a good chance of becoming the nation that will ultimately have the control of the air."

—Alexander Graham Bell, Ph.D., LL.D., April 1916.

LEAVES FROM MY BATTLE-OF-BRITAIN DIARY

By GENERAL CARL SPAATZ, USAF (*Ret.*)

General Carl Spaatz, retired first Chief of Staff, United States Air Force, is one of the world's leading authorities on air power. A pioneer Army flyer, he served in the 1st Aero Squadron on the Mexican Border in 1916 and, as a Major, commanded the 3rd Aviation Instruction Center at Issoudun, France, in 1917-18. Later, in the St.-Mihiel offensive, he brought down two enemy aircraft and won the D.S.O. His most famous exploit between the wars was as commander of the "Question Mark" airplane which set a 150-hour refueling flight record at Los Angeles in January 1929. In World War II General Spaatz commanded the Eighth Air Force in England and was chief air adviser to General Eisenhower in North Africa in 1942; in 1943 he commanded the Northwest African Air Force, and in 1944 returned to England to command the U. S. Strategic Air Forces in the climactic phase of the war in Europe. In August 1945 he assumed command of the U. S. Army Strategic Air Forces in the Pacific, and it was under his direction that the two atomic bombs were dropped on Hiroshima and Nagasaki. General Spaatz was the only senior American officer to witness the surrender of both Germany and Japan.

In May 1940, while chief of training and operations at Hq., Air Corps, General Spaatz, then Colonel, was sent by General Arnold to England as an observer to study training and tactics of the R.A.F. and unofficially to discuss British aircraft requirements in the light of the American aircraft production and training programs. He sailed from New York on the U.S.S. "Manhattan" on May 18 and arrived at Naples, Italy, on May 27. He proceeded to London by air, stopping over for several days at Genoa and Paris. In addition to the Diary which he kept during his 18-week tour of duty in Europe during the Battle of Britain period, General Spaatz sent numerous cabled reports to General Arnold which gave invaluable first-hand information on the R.A.F. and G.A.F. and helped to formulate American air policy. On his return to the United States, General Spaatz—significantly—became chief of plans of the U. S. Army Air Corps.

Friday, May 31, 1940

Kelsey and myself . . . arrived Hendon Airport, London, 8:50 P.M. Taxi to Cumberland Hotel. McDonald joined us while we ate dinner. Three tanks on airdrome for parachute and transport troop attacks. . . . Airplanes well scattered on Hendon Airport but no attempt to protect or conceal other than camouflage. Servicing by motor truck. Balloon barrage over Portsmouth and London.

Saturday, June 1, 1940

Joined McDonald at Embassy in morning. Presented to the Ambassador. He stated present time advantageous to get information. We told him

our interest primarily in training and tactics. . . .

Sunday, June 2, 1940

Discussions to date and observations have given following:

P-36 still effective. Spitfire superior to Messerschmitt. Age of German pilots taken prisoner very young. Flying time of many of them less than 100 hours; one reported as about 20 hours.

Gliders reported being used for troop transportation. Parachute troops have been effective. Airdrome protection against parachute troops and enemy troop transports by tanks.

Close liaison between German mechanized troops and airplanes. Dive bombing used to great extent in support of mechanized troops. Dive bombing is an all-inclusive term which may include glide-bombing, low-altitude attacks (as per our attack aviation) as well as dive bombing. German use pursuit for ground attack.

Dispersion, camouflage, and protection necessary for airdromes, but not in effect at all airdromes seen. Lack of lights on airdromes at night makes special training for night servicing and operations essential.

Recognition signals important but not satisfactorily worked out. Number of cases of friendly planes shot down by ground fire and by own aircraft. . . .

Belgian Air Force put out of operation first morning. German bombers over each airdrome before daylight. Belgians waited for daylight to take off but were attacked and practically all destroyed before they could get off. . . .

Monday, June 3, 1940

Lunch with Air Commodore Slessor (Plans, RAF), Scanlon, McDonald, Kelsey. Highlights:

Supreme Council. Working members of various armed services in close liaison with other services. Effort to avoid tight compartments of staff action and to receive close coordination of each branch's problems and capabilities before plan carried out.

Dive bombing. Dive bombing no better than horizontal bombing. Morale effect greater than casualty effect. Dive bombing requires definite ceiling and subjects planes to all forms of AA and makes them more vulnerable to greater number of pursuit. Requires less training. Barrage pattern cannot be obtained as with horizontal bombing. Dive-bombing attacks on troops and boats at Dunkirk not particularly impressive in view of great numbers of troops evacuated in face of superior air power. Slessor believed horizontal bombing of restricted area by large formations would have had greater effect.

Night pursuit has been ineffective and no evident solution. Night bomber losses very slight.

Neck of bottle is beginning to be combat crew in RAF. Holding their own in equipment; getting thin in pursuit due to greater losses than anticipated; holding their own in bomber since losses less than planned for.

Since trained pilot is essential and personnel becomes neck of bottle, large bombers for air power operations have advantages because of larger load and longer range.

Deep strategic operations planned for interrupted by German breakthrough. French think only of battle and not of strategic air operations. RAF apparently thinks as we do but have been hindered by higher ups. . . .

We will find that 500 hours' experience will be quite satisfactory for pilot of big bombers.

He agreed range of daylight operation, in good weather, of bombers is

range of pursuit. However, air power embraces large bombers capable of delivering heavy attacks at long range under cover of darkness and unfavorable weather.

Navy admit they cannot operate within effective radius of shore-based aircraft.

Their fighters should have 45 to 60 minutes more fuel. They were designed primarily for defense of England and had too little fuel for Dunkirk operations. . . .

He estimated German losses to date 20%.

Consensus at lunch that next German move would be as far away from RAF bases in England as possible. If this is case, it will confirm RAF reports of German air losses.

Tuesday, June 4, 1940

Report of air raid on Villacoublay and other airdromes around Paris. German forces estimated at 200. Bombing from 25,000 ft., very inaccurate. Little damage done at Villacoublay.

Wednesday, June 5, 1940

Use of single-seater, stripped of armament, as photographic plane is being pushed by RAF.

German drive against French Army started today between Abbeville and Rheims. . . .

Friday, June 7, 1940

Visited Headquarters of Directorate of Operational Requirements. Spent one hour or so questioning Air Vice Marshal Saundby, . . . Result of visit made basis of our first report, No. 41244.

Monday, June 10, 1940

To Reading to visit Hq., Training Command. Met Air Vice Marshal Pattison, C.O., the Duke of Kent, Group Captain Vatchell, formerly Air Attaché at Berlin and friend of Truman Smith, and Wing Commander Cocke who knew his stuff. . . .

Tuesday, June 11, 1940

Inspected Initial Training Wing at Cambridge in morning and Elementary Flying School (Squadron Leader May) there in afternoon. . . . Saw Italians evacuate Embassy in late afternoon. . . .

Monday, June 17, 1940

Visited Headquarters of Bomber Command, Air Marshal Portal, C.O. This Hq. so well concealed and efforts to maintain secrecy of location so thorough that we were quite late in meeting our appointment. After some discussion . . . of the system, we visited OTU's for Blenheims and heavy-bomber types. Back to London about 9:30 P.M. News of France's capitulation heard today at OTU for Blenheims. Saw one of barrage balloons falling in flames as we approached London. . . .

Tuesday, June 18, 1940

To Blenheim Bombing Wing, Group Captain Vincent, C. O., in morning, where we had lunch, and to Heavy Bomber Wing in afternoon, Group Captain Modin. Discussion with squadron leaders and others indicated that training system delivered crews in proper shape for active operations. In heavy bombers, however, new crews were distributed amongst several planes to maintain leaven of experienced personnel.

Wednesday, June 19, 1940

To Pursuit OTU at Paddington. Talked at length with three officers who were in France with Fighter Squadron No. 1, Hurricanes. This squadron shot down 80 planes in five days, confirmed, and probably an equal

number unconfirmed during invasion of Holland. . . .

Thursday, June 20, 1940

To Hq., Fighter Command. . . . After short visit at Headquarters, proceeded to field at Northolt. Lunch and then looked over place. Spitfire squadron and Blenheim fighter squadron, also Pursuit Development Unit. Movie films of combat, gun cameras synchronized with guns, were shown. . . . Pilots on alert. Motors warmed every 15 minutes. Concrete road all around field.

At 3:30 P.M., to Hq., Coastal Command. Discussed training and operations procedure. Contact code requires speed and accuracy before secrecy. . . .

Wednesday, July 3, 1940

Cable from U. S. authorizing me to stay. . . . Kelsey off to Ireland and U.S.A.

Combat units of RAF last fall which have probably not been increased up to July 1:

Fighter Command in England—3 groups totaling 40 squadrons of 16 planes each: total 640.

Fighters in France—6 fighter squadrons: total 96.

Bomber Command in England—6 groups of 56 squadrons: total 728.

Coastal Command—25 squadrons at 12 per squadron: 300.

Bombers in France—12 squadrons at 16: total 192.

Thursday, July 4, 1940

Lunch with Air Marshal Gossage and Air Commodore Kingston-McCloughry, Hunter and Scanlon at Carlton.

Lack of bombers of suitable range again emphasized. Apparently, from reports, Germans are training for invasion in Baltic Sea using 40 ships of 5,000 or more tons and other craft which would be excellent targets if bombers could reach them.

Saturday, July 6, 1940

Percentage of losses prepared by Conrad from official daily War Room reports:

Day bombers—6.7% per mission
Night bombers—1.7% per mission
Fighters—5.5% per mission

Air Ministry claims that 2,900 German planes have been shot down from beginning of war to date.

Sunday, July 7, 1940

To Whitney and flew three hours with 10 landings. Stopped six times by sentinels en route to field.

To Greenwall's for cocktails. Met Daniel of *New York Times* and a British Captain Petley who is married to Col. Gillmore's (1903 Class) daughter. . . . Petley served in BEF. Jealousy between RAF and Army deeply rooted. Soldiers failed to realize help RAF gave at Dunkirk and upon return to England were deeply incensed against them. Whether or not officers took pains to inform them properly is not known. However, it is apparent that adequate AA defense weapons were not available in the BEF and, if they had been, the story might have been different.

Saturday, July 13, 1940

To 75th Squadron (New Zealand). F/O Freeman discussed navigation. Astro, using Weems curves, is used. Not all navigators are trained astro, but experience with DR above clouds when errors of 80 miles in 300 have been had indicates necessity for astro navigators in all bombers. . . .

Methods of bombing. Dive in which Wellington is placed in steep dive (speed over 340 mph) and target hit

from about 2,000 ft. Another method: Plane dives at target, releases flare, zooms, and completes run and drops bombs about time flare is burnt out. AA is dodged by sideslipping as beam appears to be getting on plane. Very seldom held in beam for more than 20 seconds. . . .

Tuesday, July 16, 1940

Back to Feltwell. Operation last night with 16 planes. Freeman states balloon barrage at 14,000 ft., also AA fire of chain-flaming-onion type. . . .

Apparently no effort to use weather reconnaissance planes in advance of committing the whole squadron. Missions called off when weather is uncertain. Believe tactics of bombing can be improved. Although night bombing has resulted in few losses, believe answer to bombardment is altitude, speed, and daylight attack, preceded by weather reconnaissance plane in uncertain weather. Some of the more frank pilots have doubts as to effectiveness of their night attacks.

Monday, July 22, 1940

To Feltwell. . . . Raid called off at Feltwell; went to Mareham, Group Captain Keith. . . . Seven planes (Wellingtons) were sent on the mission. . . . We waited their return. Watched some of them land from top of water tower. Field had obstruction lights and landing beam lit. Planes used landing lights. All lights shut off for some time when air raid warning sounded. Six planes dropped their bombs, two of them on alternate targets. One could not locate target and returned with his bombs. No enemy resistance encountered except AA. Moon bright but weather in Germany reported as hazy. . . .

Apparently night bombers are not being used under doubtful weather conditions and, by excessive centralization of control, there is not sufficient flexibility in shifting targets in case of weather. Bombing so far could be termed harassment over a large area rather than bombing for destruction. However, British bombing is better than German. An attempt is made to concentrate a number of planes on an objective and also teamwork in light-up of objective. However, German night bombing so far has been by individual planes, no illumination of target, and with very poor results.

Monday, August 5, 1940

To Whitney—flew three hours 10 min., 10 landings.

To Slessor's place for tea and supper, thence to London with Slessor.

Super staff in effect, with Chiefs of Plans of Army, Navy, and Air Force. A junior working member of each draws up studies in detail, each coordinating with their respective service. Then Chiefs of Plans meet and digest, calling upon Foreign Office, Home Office, Colonial Office, for any information or assistance they desire. Chiefs of Plans are not bound by any agenda from their Chiefs in preparing the solution of any problem, such as the invasion of Norway. When finally presented the Chief of the Service of course can disagree. However, the report as finally drafted by the Plans Council is submitted to the Prime Minister.

Since the last war, the military head is expected to voice his disagreement to any plan contemplated, and his disagreement must be recorded in writing, this to insure that the political head assumes full responsibility for action counter to the military head's advice. Although this appears to be more coordination than is in effect in the U. S., it is still not believed to be the final answer to full coordination for national foreign policy and par-

ticularly a foreign policy which may involve the use of force to carry it out. It must be evident that any policy such as the British adopted in guaranteeing Poland should not be undertaken unless the Army-Navy-Air Forces are fully certain that they have the means to enforce it.

A super staff with full representation of the State Dept., Labor, Commerce, War, and Navy should be the agency which prepares the recommendation for any policy which may involve the U. S. in war. It would appear that some means to coordinate definitely the various budgets, the military policy, and the foreign policy is necessary. To this end, a supreme war council, composed of the Secretary of State, the Assistant Secretary of State, the Secretary of War, the Assistant Secretary of War, the Chief of Staff, the Secretary of the Navy, the Chief of Naval Operations, with a working staff composed of representatives of the State Department, the War and Navy Departments, might present an approach to this. . . .

The question of lessons learned from the war was discussed. I stated that one distinct lesson from the French collapse should be that an army on the defensive is liable to lose its morale and that if England remains continuously on the defensive awaiting an attack which never materializes there may be collapse from within; that it would be erroneous to assume that Germany will collapse from within, and that if Germany should ever learn to use air power as some air enthusiasts think it can be used England might starve before Germany, particularly if Germany moves to obtain full control of the Mediterranean and the trade routes to the Far East as well as northern Africa. Unless England's policy of starving out Germany succeeds, an action which embraces the use of England as a strong defensive center to maintain sea blockade of the Atlantic and [as a base for] air operations against Germany, plus a movement of strong U. S. air, navy, and ground forces via Natal, Africa, to obtain control of the Mediterranean, and thence an offensive against Italy, seems to be the best approach to the defeat of Germany. He agreed. . . .

Friday, August 16, 1940

To Dover. . . . Lieut. Leslie, Gen. Staff, B. Army, accompanied me. Attack on Short plant on airdrome near Rochester had taken place just before we passed there about 4 P.M. Buildings looked damaged considerably. Several bomb craters in road. Tetling airdrome badly hit day before. C.O. and two squadron commanders and a number of others killed when bomb hit headquarters building. All messes hit, also WAAF's quarters. Six Blenheims prepared for a mission were destroyed. Total casualties about 35 killed, 70 wounded. Still operating from airdrome. . . . Dive bombers used and no warning received; apparently planes came out of clouds. . . .

Saturday, August 17, 1940

To Shakespeare Cliff with newsmen. No action. Drove to old Norman church. Saw where bomber had fallen in churchyard very close to church but no serious damage. No apparent damage at Dover except one ship about 1,000 tons with back broken in harbor. Saw much bombing going on across Channel at Calais—star shells, AA, etc. No activity on our side.

Sunday, August 18, 1940

To Shakespeare Cliff. . . . Saw attack on formation of bombers too high to see anything but streaks of condensation in the sky. Saw one falling. In afternoon saw AA attack on three

German bombers; also attack on 26 Blenheims by their own AA. All AA guns very inaccurate. One Me 109 shot down a balloon. Heavy barrage of all kinds of AA, including Brattle guns in air, but no effect. In evening much activity across Channel again and several bombers bombed vicinity of Dover, closest being 15 seconds, 15,000 yards, away. Searchlights unable to pick up bombers in spite of almost ideal condition of cloud bank at 9,000 ft.

Monday, August 19, 1940

Left at 11:00 A.M. for London. . . . Morale around Dover and other places does not appear to be shaken. Guns have been fired across Channel and several shots hit city. Dinner with Generals Strong, Emmons, Slessor, and Courtney. . . .

Tuesday, August 20, 1940

To Northolt. Spent several hours with Wing Comdr. Vasse. . . . Vasse stated good results have been obtained in several combats when their fighters, with formation of 6 or 12, ran into large formation of bombers—40 protected by a large number of fighters. In their attacks a frontal approach was made which prevented the German fighters from getting on their tail and the leader of the bomber formation shot down. Thereafter the remainder of the formation became confused and scattered. Believes best tactics to concentrate a large enough fighter force to effect heavy losses on some formations rather than a dispersion to obtain a little effect on all formations of bombers. . . .

Saturday, August 24, 1940

Up at 4:30 A.M. to listen to reports of crews. Watched several planes land and then to Intelligence office. Most of crews found objectives although weather was not too good. Cloud at 4,000 ft. over France and icing conditions in clouds. Pilots remained over target area as long as one hour 15 min. to identify positively and get good shot at target. In one case Germans put out flare path, probably mistaking plane for one of theirs. Crews smiling and quite peppy considering fact they had been in flight from 11:30 to 4:30 and later.

To bed for several hours. Then to Sinclair's place to see his gun installation. . . .

General consensus that destruction of air forces on ground, if properly dispersed, is most difficult, and that destruction by fighters in air much more efficient since crews are generally lost. However, with new turrets with four guns and increasing armor, their destruction in the air requires increased calibre and ranges.

General opinion is that German fighters will not attack a well-closed-in day-bombing formation. In many attacks the German tactics were elemental, showing lack of training, one plane diving at a time and pulling away in manner to expose him to maximum fire. Best defense is to get as close to ground as possible. Single planes use full boost close to ground and have flown as long as one hour with full boost without damaging motors, altho instructions are not to use it for more than five minutes. . . .

Upon arriving in London, air raid on. Later, about midnight, another raid. Bombs could be heard and fire of some intensity started to east along Thames. Later raid passed over our apartment. Lots of searchlights but plane not picked up.

Sunday, August 25, 1940

Quite a large number of bombers over London tonight. Watched a number (at least 10) of attempts at illu-

mination by searchlights, none of which was successful. Sky clear except for an occasional small cloud. At least 35 lights at time trying to pick up one airplane. Raiders apparently disturbed normal life in London from early in the evening until 4:30 A.M.

Tuesday, August 27, 1940

Lunch with Group Captain Baker, Deputy Chief of Plans. . . . As result of conversation, the following developed:

Old conception that place to destroy air force is on ground has been thoroughly disproved. A well-dispersed air force is almost impossible to destroy on the ground, and bombs expended on such effort can be better used against oil tanks, factories, etc.

Tactics now being used are to cover as much area as possible with a few bombers for nuisance value and concentrate mass on targets with complete destruction in view. This applies to night operations.

Dive bombers are too vulnerable for use against well-defended targets and in face of fighter opposition. Ju 87's have all been withdrawn from operations against objectives in England.

Big-gun fire has not been effective. Small arms, machine gun, and cannon has been effective.

Germans have well-planned scheme which they are employing with some success, *i. e.*, to close Channel, Irish and North Seas to shipping by air action, forcing all shipping to enter the Clyde where submarines can be concentrated.

Operations so far have not materially affected the RAF.

It takes close coordination with the Army to obtain the maximum misuse of air power.

Anti-aircraft has now developed to the point where it delivers a much greater volume of fire much quicker, but with the same inaccuracy as in the last war.

Friday, August 30, 1940

To Hawker factory. . . . Saw 12-gun fighter, with 2,100-hp motor. Looks good. Air raid warning on return but no planes were seen. Told Lee this morning thought blitzkreig for this year over and that we should go home and get to work.

Saturday, August 31, 1940

Orders received to return to U. S.

Monday, September 2, 1940

Lunch with Slessor. . . . Believes big German air offensive imminent. Does not believe obtaining Egypt and Iraq would help German oil situation in less than 18 months after they had complete control. This is based on length of time it took to get into production and fact that all lines, etc., would be destroyed prior to German occupation.

Losses, German, during period August 8 to 16:

	Con.	Prob.	Dam.
LR bombers	124	61	81
SR bombers	88	20	25
Fighters	248	127	69
Other types	41	23	19

700 enemy aircraft operated over England, period 6 P.M., August 17, to 6 P.M., August 18.

Losses, August 18:

German—2 Ju 87

RAF— 1 Spitfire, 1 Blenheim

Losses, German, August 17/18, by fighters:

Type	Des.	Prob.	Dam.
Me 109	34	4	13
Me 110	26	9	8
Do 215	11	5	4
Do 17	6	3	9
Ju 87	31	2	2
Ju 88	7	1	1
He 111	8	2	1

He 113			1
?	3		3
	126	26	42

Losses, German, August 17/18, by AA:

Type	Destroyed
?	13

Casualties, RAF, August 17/18:
22 fighters (12 pilots safe)—914 missions
No losses, bombers—24 sorties

Losses, August 19, RAF:
Day bombers—21 sorties, 1 loss
Night bombers—119 sorties, 4 losses
Fighters—403 sorties, 3 losses (2 pilots safe)

Losses, August 19, German (100 planes over England):

Destroyed (Confirmed)	Probable	Damaged
1 Me 110 4 Ju 88	1 He 111	1 Ju 88

Losses, German, August 20 (400 planes used):

	Des.	Prob.	Dam.
Me 109	2	1	1
Me 110	1		
Ju 88	1	2	1
Do 215	3		2
Do 17		1 (?)	1
	7	4	5

Losses, RAF, August 20:
Fighters—477 sorties, 2 losses (1 pilot saved)

Wednesday, September 4, 1940

To Boscombe Downs. . . . Saw Air Vice Marshal Hill. . . . Looked over Stirling. Ungainly fuselage over 100 ft. long. Pilots say handles nicely. Bomb bay of exceptional length. Maximum bomb load 14,000 lbs. over 750-mile range. . . .

Cocktail party biven by Gen. Emmons and Gen. Strong at Dorchester House. 230 fighter pilots lost in August. New pilots from schools, 240. . . . Dinner with . . . Slessor at Coq d'Or. Slessor—fear of what will happen if British plants change over to production of new models, thus disturbing flow of present models. Germans in better position since they have French and Czech plants to fall back on. Hope that American production will be of models sufficiently advanced to meet threat of new German model which may appear in spring. Are laying their plans for a big offensive in 1942—if America enters some other theater, possibly N. W. Africa, since airdromes in England limited and possibly all will be required for their own forces.

Friday, September 6, 1940

To Croydon and Henley airdromes to see results of bombing. Damage at Croydon considerable. Rolls airplane factory completely demolished by five heavy bombs. Attack on first day, 14 Messerschmitt Jaguars, two bombs each, followed by another wave of 14, type unknown, probably Ju 87's. Extensive damage to hangars but field, fuel system, etc., intact and operations were not interfered with. Casualties to RAF minor, not more than six in the three raids directed against Croydon. However, casualties at Rolls plant 150. Apparently civil air raid warning not received by factory, altho military notified.

Henley wooden hangar demolished. Two hits on air raid shelter, killing one (the medico), some damage to runways which was repaired and operations O. K. within one hour. . . .

Dinner in evening with Slessor. . . . Jack confident oil situation in Germany serious and that moves toward Near East will not result in getting oil in

sufficient time to meet situation. Believes move of offensive should be by way of Near East. No good roads from West Africa hump to N. W. Africa.

Saturday, September 7, 1940

Heavy bombing of London along Thames in later afternoon, followed by continuous attacks in force throughout the night.

Sunday, September 8, 1940

One fire still burning with intensity this A.M. Check up on yesterday's raid—apparently large formation of bombers able to penetrate defenses for first time. Targets hit and fires started enabled accurate bombing throughout the night. Principal damage to East and West India docks, Woolich Arsenal, Battersea power [station], oil tanks. Probably many casualties in tenement district. Fire apparatus from points as far off as Maidenhead. Estimate 500 planes near London during period. 86 Germans brought down yesterday.

Lunch with . . . Slessor. Bombing commenced by formation at dusk. Continuous bombing by individual planes, 5 or 6 over city at time. Fires started at 8 or 10 places. Apparently indiscriminate bombing of London has started. Present strength of RAF heavy bombers inadequate to bring same firepower on Berlin. All air officers recommended immediate dispatch of all B-17's with bombs sent by ships to add strength to RAF attack. . . .

Monday, September 9, 1940

To Imperial Airways House at 6 A.M. Left in bus for Heston. On KLM Douglas, Dutch pilots, 9 A.M. Five passengers. Windows painted over, so no view of country possible. . . . Arrived Lisbon at 3:45 P.M. Wing Comdr. Chamberlayne, British air attaché at Lisbon, met me at air port. . . .

Thursday, September 12, 1940

Plane delayed in take-off again today. . . . Lunch with Mr. Pell, American Minister. About 15 at lunch. Governor Winant, Gen. Ryan among guests. . . . Differentiate between morale or will to resist and efficiency of effort due to interruption of production account of air raids. Winant seemed impressed by my belief that British air effort concentrates on building up individual initiative, while German emphasizes masses of automatons led by individuals.

Emphasis on training area. England—bad weather in winter. Germans have southern France and Italy, with good weather. Same applies to fighting effort, since Germans can take off and land in good weather areas, whereas England in winter requires instrument flying with consequent reduction of operational efficiency.

English have developed real air power whereas Germans so far appear to have developed a mass of air geared to the Army and lost when confronted with properly applied air effort.

Monday, September 16, 1940

To Pan American to check on plane. Probably will arrive tomorrow and leave Wednesday. Will go then if they carry any passengers. . . . German move to Spain and Portugal seems imminent.

Thursday, September 19, 1940

To Pan American. Gens. Strong and Emmons on board. Left 9:45. Took about 35 seconds to take off. 21 passengers on board.

THE MEN and the *Machines*

PART III

April 1916 to 7 April 1917

A Chronological Treatise on the Growth of Air Power

This concludes the treatise on the Army's air growth from 1913 until the entry of the United States in World War I, previous installments of which appeared in the October 1956 and January 1957 issues.

Service With the Punitive Expedition

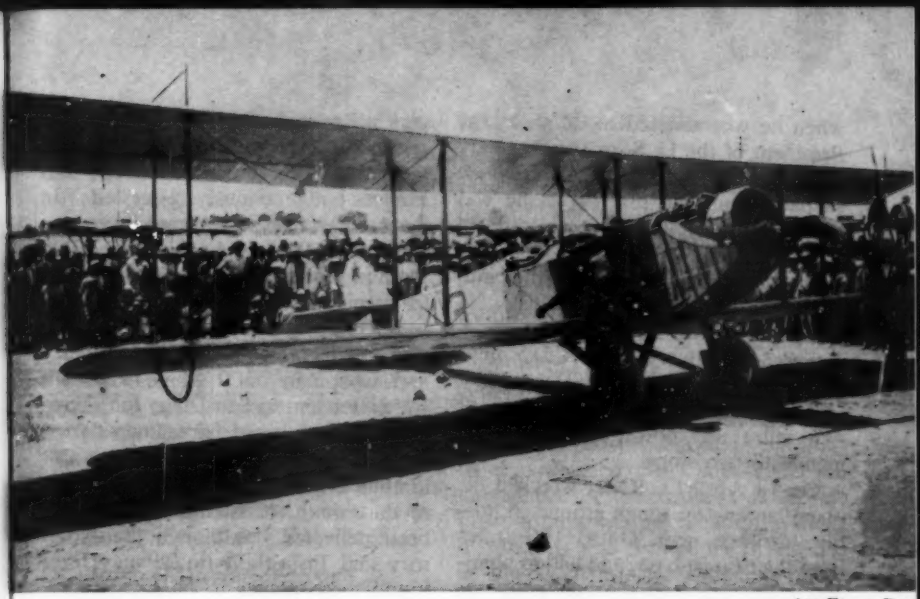
As proven from hindsight, the first time the airplane was employed under wartime conditions it was inadequate. In the punitive expedition in Mexico most of the field operational successes were the products of improvisation. Because the airplanes failed to produce as was expected of them, Capt. Foulois found it necessary to resort to the use of a little initiative in order to make best use of the eight airplanes available.

By 20 March 1916, two of the eight airplanes had been lost. By the end of March it was quite apparent that the six remaining planes could not do the job expected of them. The low-powered motors with their limited climbing ability made it impossible for them to operate successfully in the mountainous regions, and the high, dry mountain atmosphere was equally hard on the wooden propellers which warped and came apart. Foulois had asked for ten new planes, but since they were not readily available, on 30 March he suggested to the Chief of Staff a plan of operations for the most effective use of the underpowered JN3s. This plan provided for the establishment of radio-telegraph service between Namiquipa and Casas Grandes, thus eliminating the use of airplanes on this dangerous section of the route. Planes would be used between these points only if all other means of communication failed. All the planes were to be concentrated at Namiquipa for use in daily communication between that point and the troops located farther to the south. As a result, from 1 to 4 April, 43 flights were made with mail and dispatches.

On 5 April, the squadron headquarters was moved to San Geronimo, Mexico. During the following mail and dispatch missions another plane was wrecked at San Geronimo.

One of the most amazing incidents of this crazy war occurred on 7 April. Dargue and Foulois in one plane and Carberry and Dodd in another flew from San Geronimo to Chihuahua City with duplicate dispatches for the United States Consul. Dargue and Foulois landed to the south of the city, while Carberry and Dodd came down to the north as previously agreed. After discharging Foulois, Dargue was to join the other plane, but he was fired on by four mounted "rurales" as he started to take off. Foulois, who had started for town with the dispatches, heard the shots and returned. When he attempted to stop the "rurales" he was arrested and taken to jail, followed by a mob of several hundred Mexicans. Word of his predicament reached the American Consul who made arrangements with General Gutierrez, the military governor of Chihuahua, for Foulois' release.

In the meantime, Dodd had delivered his dispatches, but during his ab-



AIR FORCE PHO

Lieut. Herbert A. Dargue posing with his plane at Chihuahua City, Mexico, in April 1916 after he had been stoned by the mob of Mexicans. Dargue purposely kept the photographer busy posing him so as to keep the crowd away from the airplane.

sence Carranzistas surrounded the two airplanes, made insulting remarks to Dodd and Carberry, burned holes in the fabric of the wings, slashed the fabric with knives and removed bolts and nuts from the planes. Carberry managed, somehow, to take off before too much damage was done to his plane and flew to an American smelter about six miles away. Dargue managed to escape amidst a shower of stones, but flew only a short distance when the top section of the loosened fuselage flew off, damaging the stabilizer and forcing him to land. Dargue was able to hold off the crowd until the arrival of a guard ordered by General Gutierrez. Repairs were made, and the following day the flyers took off at 0530 in order to avoid the threatening crowds, and made it to San Geronimo without further mishap.

Squadron headquarters moved to San Antonio, Mexico, on 8 April, and on 10 April it was ordered to Satevo, Mexico. During a reconnaissance flight from the new base at Satevo, Lt. Chapman landed at Santa Rosalia and was seized by Carranza troops and taken into custody by the commanding officer of the garrison. Although he was finally released, some of the soldiers stole his field glasses, goggles and ammunition while he was absent from the plane.

On 13 April, Capt. Foulois made another trip to Chihuahua where he received, through the American Consul, an ultimatum from the military governor that the American troops were to withdraw from Mexico. Foulois delivered General Pershing's famous reply which stated that Pershing took his orders from the United States Army and the President of the United States, and that he would withdraw

when he was ordered to do so by the President of the U. S. or the Secretary of War. On this flight the wings were so badly damaged that the plane was lost, leaving only four aircraft in service.

As the squadron moved further into the heart of Mexico, the flying distances increased, and on 14 April an unofficial American distance record of 315 miles for two persons was set by Dargue and Gorrell. On 15 April a distance of 415 miles was flown by these same men with two stops.

On 14 April Lt. Rader wrecked his plane landing on rough ground in hostile territory near Ojito, 100 miles from the nearest base, and had to abandon it, thus leaving only three in operation. On 19 April, while on a photographic mission Dargue and Willis made a forced landing in the hills and wrecked another plane. Willis, who was pinned underneath the wreckage, suffered a bad scalp wound and bruised legs and ankles. After first aid was administered to Willis, the fliers burned what was left of the airplane (starting a forest fire in the process) and began to walk the 65-mile distance to San Antonio, Mexico. They avoided the footpaths where they might be spotted and kept to the woods and thickets while crossing the two mountain ranges. (This survival technique has since been taught by the Air Force as part of its survival and escape courses.) The flyers managed to make it to San Antonio after two days and two nights. A month later the doctors discovered that Willis had walked the distance of 65 miles on a broken ankle!

After one month of operation, only two of the eight planes that had been taken to Columbus, N. M., were in commission, and they were considered unsafe for further field service. Orders were received on 20 April for the squadron to return to Columbus to pick up new planes which were awaiting them. These planes turned out to be Curtiss N8s and not the type that Foulois had previously requested. In fact, flight tests conducted from the 23rd to the 29th of April revealed that the new planes were actually little better than the old ones. These planes were condemned by a board of officers composed of Dodd, Dargue, Carberry and Chapman on 9 May 1916, but were later sent to San Diego for alteration and were used for trainers.

The new Curtiss R2s arrived at Columbus on 1 May and by the 25th of the month, 12 of these planes had been delivered. Although the Advisory and Inspection Board may have found these planes to be satisfactory, the pilots at Columbus certainly did not. Every plane required alterations and the replacement of various parts.

At about this time, two features came clearly into focus; the first being that it was definitely necessary to have a backlog or a bunch of airplanes in reserve in order to back up those actually being used in the field. The other was the necessity for allowing the personnel in the field, who actually flew the equipment, to make and submit their recommendations for what they felt was really needed.

At first, it may appear that the operations of the airplanes in Mexico were a complete failure. However, on the basis of operations in the field, many recommendations were made which later made possible greater success of operation and closer cooperation between the air services and the ground troops. On 28 August 1916, Major Foulois reported that between 15 March and 15 August 1916, the 1st Aero Squadron had flown 540 missions which totaled 346 hours and covered 19,533 miles. Some of Foulois' recommendations based on actual experience were: squadrons working in

the field should have a convenient base fully equipped for reception, assembly, test, repair and alteration, from which all personnel, material and supplies could be drawn; planes should be tested under service conditions, and at varying altitudes, temperatures and humidities; and a test station should be set up on the Mexican border.

Following their field experience, the members of the 1st Aero Squadron continued with experiments and research on bombing and bombing devices, and in this project they proceeded practically on their own. They also conducted extensive tests with camera equipment and photography.

First Table of Organization and Equipment

By the 24th of July 1916, Capt. Foulois submitted a Table of Organization and Equipment for a mobile aero squadron, based on the 1st Aero Squadron's two years experience.

Headquarters:
- 1 Major, CO
- 1 Adjutant, Flying
- 17 Enlisted men
  Transportation

Supply Section:
- 1 Supply Officer
- 2 Assistant Officers, Flying (Supply and Transportation)
- 29 Enlisted men
  Transportation

Engineer Section:
- 1 Engineering Officer, Flying
- 20 Enlisted men

Aeroplane Section:
- 12 Officers (Including all but Supply)
- 94 Enlisted men

Total Personnel:
- 18 Commissioned Officers
- 160 Enlisted men

178 Total Personnel

First Twin-Engine Airplane

The evolution and growth of the airplane was inevitable and not all of the forces of conservatism naturally inherent in man could restrain this growth. Advocates of air power within the Air Service and visionaries outside the service forged ahead with their dreams and plans, foreseeing the day when the airplane would become a primary weapon system, and tried to convince skeptical people of this fact. Already, the people of Europe were learning from firsthand experience of the impact and the importance of the airplane as an adjunct to the military weapon systems of the day, and techniques in the use of the airplane were becoming more and more effective and specialized.

Altogether 51 airplanes were delivered to the 1st Aero Squadron at Columbus by 6 April 1917. Among these planes were the first six Curtiss twin-engine tractors which were delivered by 20 September 1916. Farsighted planners had encouraged the production of the twin-engine plane, a tractor, which was given Signal Corps No. 102. The average speed of this machine was only 78.8 miles per hour; it was capable of two and one half hours flight endurance, and could climb to 3,400 feet in 14 minutes. The handling of the airplane proved very exhausting to the pilots, so it was not adapted to field service. However, since it had two engines, the pilots considered that it had many advantages over single-engine aircraft. Using this as an experimental model, the flyers were able to furnish many comments and criticisms which were helpful in the further development of twin and multi-engine airplanes of the future. By March 1917 Capt. Foulois stated that there were 6 of these airplanes stored at Ft. Sam Houston.

National Guard and Air Reserve Activities

A small digression from the military aviation activities in the Aviation Section is necessary here to indicate the flying and aviation accomplishments of the National Guard and Air Reserve, inasmuch as the missions and functions of both were closely allied and connected with the functions of the Air Service, and because of their flying training prior to the First World War. Until 1916 the Signal Corps School at San Diego was considered adequate for the Aviation Section's needs, but as the war in Europe progressed, the need for other flying schools became more and more evident. The first of these schools was opened at Mineola, L. I., New York, in July 1916, and as war became more imminent, other schools were opened at Chicago, Ill., Memphis, Tenn., and Essington, Pa.

The school at Mineola was originally created to train pilots for the Mexican skirmish. As this need diminished, plans were altered and it was decided to give training to officers of the militia of the various states. Lt. Joseph E. Carberry, who was transferred from the 1st Aero Squadron, became the first commander.

By January 1917, there were on duty at Mineola: four officers of the regular establishment, Capts. Carberry, Kilner, Rader and S. W. Fitz Gerald; nine militia officers; 110 enlisted men; and 35 civilian employees. During the short period of the existence of this station, 60 officers had either been trained or were undergoing training there.

Activities at Mineola included experiments with live bombs, night flying, night lighting, code, flares, airplane cameras and cross-country flying. It was here that Lester P. Barlow, with the assistance of many of the service men, developed the first detonation type bomb which was fused to go off above the ground.

On 30 and 31 December 1916, the National Guard group flew a cross-country mission in conjunction with the Army from New York to Philadelphia and return, a distance of 220 miles. The flyers all wore experimental army cold weather clothing. Although the temperatures on the ground were around zero, at flight altitudes they were about minus 18 degrees, and the flyers reported that they nearly froze.

In February 1917, Capt. Carberry prepared a loose-leaf administrative manual for the guidance of commanding officers charged with the establishment of other schools. This was probably the first official SOP.

The third flying school was established at Ashburn Field near Chicago, Ill., in the summer of 1916. The land was obtained through an arrangement with the Aero Club of Illinois, which was operating the field. Lt. Joseph C. Morrow was ordered from leave to Washington for consultation, thence to Chicago to establish the school. Flying started in November but ceased in December because of the sleet and snow, and Morrow was sent to Memphis, Tenn., to organize a fourth flying school at which flying could be conducted during the winter months. The civilian pilots and mechanics at Chicago had been retained and were ordered, along with 20 civilians who had enlisted in the Officers Reserve Corps, to Memphis to continue their flying duties early in 1917.

The field at Driving Park, inside a mile race track, was too small to permit extensive flying. Very little soloing was done here. Flying ceased altogether at Memphis in April 1917 and the school returned to Chicago. However, in May the school moved again, this time to Rantoul, Ill., to Chanute Field.

In February 1917, the fifth flying school was authorized by Lt. Col. Squier, Chief Signal Officer, for Essington, Pa., where a civilian flying school had been in operation under Robert Glendinning. Capt. William C. Ocker was ordered to organize a temporary aviation station for the training and development of the 2nd Reserve Aero Squadron, to be used in conjunction with the coastal defense forces of the Philadelphia area. On 7 July 1917, Capt. L. E. Goodier, Jr. became commanding officer of the 2nd Reserve Aero Squadron, and on 3 November 1917 this station was discontinued.

The National Defense Act of 3 June 1916 had authorized the establishment of a Signal Reserve Corps. In the advent of war the aviation units of the National Guard would go out of existence, but prior to the war its members could be relieved and volunteer in the Signal Reserve Corps. The greater part of the flying training for these reservists was conducted in New York, under the impetus given to flying by a group of wealthy New York citizens.

In May 1917 the Comptroller ruled that a fund of $900,000 was available for preliminary training at civilian aviation schools for personnel of the Officers Reserve Corps and of the Enlisted Reserve Corps. The Curtiss Company had already established a flying school at Newport News, Virginia, in 1915, and Major William Mitchell, who was on aviation duty in the Office of the Chief Signal Officer, learned to fly there in the fall of 1916. On official orders he visited the school on weekends and received instruction from several of the Curtiss Company instructors: Victor Carlstrom, Stewart W. Cogswell, James M. Johnson, Walter E. Lees and Victor Vernon. Capt. T. D. Milling also gave him a flight or two during an official visit to Newport News in December 1916.

Walter Lees is given credit for soloing Mitchell. Lees said of the solo flight: "Mitchell was very erratic. One day he would be O. K. and the next lousy. I just happened to catch him on one of his good days. He made two perfect flights this day." Mitchell was later rated as a JMA in July 1917. The bill for his instruction amounted to $1,470 and the tab was not picked up by the government because of a ruling that none of the appropriation for civilian schools could be used for instruction of Regular Officers at civilian schools. This bill was sent to Billy Mitchell for payment when he was stationed with the American Embassy in Paris on 13 April 1917.

By 6 April 1917, when the United States entered the war, volunteering for aviation service in the Signal Reserve Corps had become an individual matter, but this was prohibited by the draft act of 18 May 1917.

Only one National Guard squadron had been mustered into federal service and it had been mustered out months before the United States entered the war. An earlier plan to take in the reserve units was dropped, although the 1st and 2nd Aero Reserve Squadrons were already in the federal service. While the number of Reserve Military Aviators turned out by 6 April 1917 was rather small, the rate was greatly accelerated thereafter, because the basis for a training program with provision for expansion had already been laid.

Aviation Section Inventory, January 1917

On 5 January 1917, the Chief Signal Officer reported that there were on order, but not yet delivered, 302 airplanes, and that 73 planes were in the service at the following places:

Manila	4
San Diego	30
Mineola	18
San Antonio	7
Columbus	14

It was expected that the Aviation Section would have within the year 1917, four squadrons for the Regular Army in the United States (two to be in San Antonio); three squadrons for overseas possessions; and six reserve squadrons for coast defense. It was estimated that these 13 squadrons would require about 286 regular officers and the remaining vacancies would have to be filled from the Reserve Corps. Although the President had authorized 1,800 enlisted men, only about 800 were on duty at the time. It had been estimated that the 13 squadrons could be maintained at a cost of $600,000 each for the next fiscal year, and four more squadrons could be added at an original cost of $800,000 each.

It was generally agreed that under wartime conditions the airplanes of the day would wear out after an average of about three months' service. Personnel of the Aviation Section estimated that it would take about four airplanes to keep one machine in service at all times. The life of an engine was figured at about 300 hours and the cost reckoned at around $50.00 per horsepower.

While Major B. D. Foulois, Department Aviation Officer, Southern Department at San Antonio, was developing a site at San Antonio and organizing the 3rd Aero Squadron, plans were implemented for the organization of the 6th and 7th Aero Squadrons. On 9 January 1917, Capt. John F. Curry was relieved from duty with the 1st Aero Squadron and ordered to Ft. Kamehameha, Hawaii, to organize the 6th. He arrived on 13 February with orders to establish a seaplane base for Curtiss N9s, and he selected Ford Island in Pearl Harbor. In March he was followed by Capt. John B. Brooks and a detachment of 49 enlisted men. Capt. Brooks became commanding officer of the Squadron in July.

At the same time, Capt. H. H. Arnold was relieved of duty at San Diego and ordered to Panama to organize the 7th Aero Squadron. He was followed in March by Lt. C. W. Russell. Arnold did not remain long in Panama, however, for in April he was returned to the United States for duty in the Office of the Chief Signal Officer.

The Robertson-Bishop Incident

Meanwhile an incident occurred at the San Diego school during the month of January 1917 which is worth recounting because of its many interesting facets and because of the structural reorganization which it brought about. On the morning of the 10th of January, Lt. W. A. Robertson took Lt. Col. H. G. Bishop (who was attending the short field officers course at the Flying School) for a ride in one of the school airplanes.* They took off from San Diego with the idea of going to Yuma, Arizona, but did not take into consideration the winds, and drifted considerably off course. At this time flyers were not yet trained in dead reckoning, and as a consequence of being off course, they ran out of gas. They had come down on the shore of what Lt. Robertson presumed to be part of the Salton Sea. While making the forced landing the plane flipped over on its back, but neither man was injured. When the tide began to come in, the two men realized their mistake and decided that they had landed on the shore of the Gulf of California, in Mexico, along

*Gen. Lahm, in his autobiography, has stated that the flight was unauthorized.

the southern edge of the Sonora Desert, miles from any habitation. Each officer gathered together his two sandwiches and two oranges, and drinking water which was drained from the radiator of the plane into a gallon can. With the compass of the airplane they started out on foot for the Colorado River. But the going was so rough in this direction that they changed their minds and headed straight north instead, hoping to reach the Southern Pacific Railroad somewhere near Yuma.

On the fifth day after their accident the food and water ran out, and they were forced to drink the dew from the cactus plants in the early morning. Because it was January the days were hot, but not unbearable, and they were able to survive the cold nights because they had with them their flying jackets.

By the morning of the eighth day, Bishop could go no further; but Robertson, who was younger and huskier, stumbled on in a final effort to reach the railroad. Curiously enough, on the morning of the ninth day he chanced upon some car tracks which he followed. Eventually he came upon two Mexicans who happened to be members of the searching party which had been sent out from Ajo, Arizona, by John Greenway at the request of his friend Col. Wilder, an 11th Cavalry Officer who was in charge of the border patrol at Calexico. Under instructions and guidance from Robertson, the Mexicans found Bishop, weak but still alive, 30 miles to the south in the Rosario Mountains. The two flyers were then taken to Wellton and put on a train.

In the long desperate tramp through the desert, Bishop had injured his foot and gangrene had set in. After his arrival at a hospital, several of his toes had to be amputated. He later returned to duty, however, completed his Army career, and retired as a Major General. Robertson, on the other hand, after a short rest seemed none the worse for his experiences. Four days later he was playing polo. Evidently, however, the ordeal had some effect on him which was not readily apparent at first, for some time afterwards he fell ill and never fully recovered. He was finally given a medical discharge.

In the meantime officers and men of the school at San Diego had attempted to organize a search party as quickly as possible, but due to a series of circumstances beyond the control of the school, the search planes from North Island never did find Robertson and Bishop. The usual number of misleading rumors and reports had to be checked for authenticity, and of course this was time-consuming. It was several days after the plane failed to show that it was definitely ascertained that it had gone down in Sonora.

A relief party was organized under Major Frank P. Lahm and proceeded to Calexico on the 14th to establish a camp which would serve as a base for the search operations. This was finally accomplished after much haggling and compromise with Mexican officials. At Calexico, Lahm learned that he could confine his search to the Sonora Desert, and accordingly decided to clear a landing field at Black Butte, about 18 miles below the border. This plan of action met strong opposition from the Mexicans because of the unfriendly relations which existed between Mexico and the United States. Governor Cantu of Lower California could not be located, and his staff interposed numerous typical obstacles before it was finally agreed that the planes could be "pushed" across the border, inspected by the Mexican officials, and allowed to proceed on the search.

An integral part of the search mission, a truck train, likewise had to cross the border, but the Mexican official who could grant the permission could not be found. Finally, an American consul in another town nearby, persuaded the local officials to allow the truck train to go through early on the 16th.

By noon that day a landing field had been cleared, just in time to permit Lt. Dargue and Cpl. A. D. Smith to land. Dargue reported that he and Smith alternated at the controls of the plane and standing on the wings while searching, but saw nothing. It was later learned that Robertson and Bishop had seen the plane and heard it, but were unable to attract its attention because they had no signaling equipment. On the 19th when word was received that the flyers had been found, Lahm's relief party and truck train left for San Diego and arrived there on the 21st.

Much criticism was leveled at the school commander for not taking a more aggressive role in the search, and Col. W. A. Glassford, the school's commanding officer, was retired in April and replaced by Col. A. L. Dade.

Council of National Defense

At the request of President Wilson, the Council of National Defense was reorganized on 3 March 1917. The Advisory Commission was composed of: Daniel Williard, Chairman (Pres. of B & O Railroad); Bernard Baruch (Banker); Samuel Gompers (Pres. of the American Federation of Labor); Julius Rosenwald (Pres. of Sears Roebuck); Dr. Franklin H. Martin (Sec'y General of the American College of Surgeons); Howard E. Coffin (Vice Pres. of the Hudson Motor Company); and Dr. Hollis Godfrey (Pres. of Drexel Institute). Each was made chairman of a special group of activities on which he was well informed. This had hardly been accomplished when the United States entered the War. While there was no army adequate for war, the country had a good basic industrial organization for peace, which served as a foundation for the demands of war, and the newly appointed Council applied itself to the task of industrial and economic mobilization.

Joint Army-Navy Board

The action on the Council was followed almost immediately by action by the Joint Army and Navy Board on Aeronautic Cognizance. This Board reported to the Secretaries of the Army and the Navy that maximum advantages could be best achieved through the joint organization and operation of the aeronautical services of the Army and Navy in wartime, rather than by separate development of each service within its delimited and exacting areas of responsibility.

This recommendation on the use of Army and Navy air power in the defense of this country later proved to be a shackling influence on the free and unfettered development of the airplane as a unique and different weapon system, because these recommendations established a precedent and limited the thinking of the policy planners for the future use of the airplane.

In general, it was agreed that the Army would defend the harbors, cities, factories and utilities on shore, while the Navy would operate principally on the sea with bases on shore. Army and Navy commanders would therefore have to familiarize themselves with each other's plans for effective cooperation.

The Army's aircraft missions over the water were primarily defensive and were permitted as a matter of security, to obtain information for the territorial

commander and to furnish firepower control to local coastal artillery commanders, and to aid both the Army and the Navy in scouting the enemy operating in and near the vicinity of the coast lines. (Note that the airplane was considered only in the role of a defensive weapon.)

The Joint Army-Navy Board submitting this report consisted of: Brig. Gen. G. O. Squier, CSO; Capt. G. R. Marvel, USN; Capt. Hugh Rodman, USN; Capt. J. S. McKean, USN; Maj. S. D. Embick, CAC; and Maj. D. T. Moore, GS. The Army was slightly outranked and outnumbered. The report was approved and signed by both the Secretary of War Baker and Secretary of the Navy Daniels.

Preparations in the Final Phase for World War I

As war became more and more inevitable, preparations swung into high gear when, on 22 March 1917, a Reserve Corps was authorized under the National Defense Act; on 29 March the first war program was drawn up at a meeting of the National Advisory Committee for Aeronautics. This meeting produced a project for building 19,070 airplanes for the Army and the Navy, and although this idea was approved by the Chief Signal Officer, it was not sanctioned by the War and Navy Departments.

An appropriation of $54,000,250 was requested to provide a force of 1,850 aviators and 300 balloonists to make up 16 aero squadrons and 16 balloon companies. This fund was also to provide for nine schools, each of which was to turn out 150 pilots a year, with the civilian schools turning out the remaining 500 pilots and 300 balloonists within the year. The actual appropriation amounted to $43,450,000 and was approved on 15 June 1917.

On the 5th of April General Squier appointed Mr. Sidney D. Waldron, Inspector of Airplanes and Airplane Motors, Signal Service at Large, to head a committee whose function it was to put the aircraft building program on a practical business basis in order to speed up production. Mr. Waldron was allowed to select a small staff of experts on production in its various phases; this staff became the Aircraft Production Board on the 16th of May.

When war was declared on the 6th of April, 1917, the Curtiss Company was capable of turning out 2,500 JNs and 700 Rs a year. This was because they were working on orders for the British. It was estimated by the Curtiss Company that by working one shift only they could deliver to the United States government 130 planes in the month of April, May and June; 200 in July; 250 in August, September and October; 275 in November; 300 in December; and 350 in January and February of 1918. A second shift could increase production by about 50% and a third shift, or round-the-clock operations, would increase the output by about 100%. It might be noted in passing that the production of airplanes in England at this time was about 300 airplanes per week.

Since aeronautics had been sorely neglected up until 6 April 1917, the United States had on hand only a handful of flyers and a limited number of flyable machines. The Navy had 48 officers, 230 enlisted men, 54 planes, 2 kite balloons and 1 unsatisfactory dirigible in their air service. The Army had 131 officers, 1,087 enlisted men, and, according to an army report at that time, "less than 300 training planes, all of the inferior type."

A later inventory record, or "Consolidated List of Aircraft Contracts and Deliveries," showed that the Signal Corps had bought, from the time

of the purchase of the first plane in 1909 to 1 November 1919, 14,274 airplanes. Of these 13,894 were purchased between 6 April 1917 and 1 November 1919, under the impetus of the war. This meant that 380 airplanes were supposedly purchased prior to the date of declaration of war, but of these 380 about 66 cannot adequately and justifiably be accounted for because of discrepancies in lists, shipping orders, cancellations, and various other reasons.

One thing remains certain from a study of this portion of history—the United States was not prepared for war. Although studies had been made on the use of airplanes in actual combat during the several years of war in Europe, the United States was sadly lacking in planes, men, airfields, instructors, students, curricula, and particularly in experience. Not a man had been trained for overseas combat; in fact, it was not even known what type of training to give to radio operators, photographers, mechanics. Inevitably then, the United States found herself operating once again from hind posture rather than from positive attitude with foreplanning.

In this war, as in the next two that followed, there was a cushion of time and allies which enabled the United States to build up its air might. We have observed even as early as the punitive expedition on the border of Mexico that as soon as trouble became absolutely inevitable, there was a big rush to develop airplanes and trained flying personnel, and as soon as the trouble subsided the emphasis was removed from air power and transferred again to the antiquated more conservative systems which had become traditional. Consider the rapid buildup during World War I, and then the even more rapid demobilization following the Armistice.

Edward Mead Earle, in his article entitled "The Influence of Air Power Upon History," written for the *Yale Review* of June 1946, said: "It was not until 1918—too late for practical effect—that plans were formulated for an independent air force with which the allies were to bomb German industrial targets, systematically, persistently and on a large scale."

It has often been reported that in a democracy where the government is the agent of the popular will, the military policy is dependent on public opinion. Certainly, as has been shown, this was evident during this period of the early struggles by those enthusiastic aviators who tried to popularize the airplane and to prove its necessity and worth as an outstanding new weapon system.

It has been one of the objectives of this historical report to attempt to develop an awareness for the necessity of a preparedness program for our Air Force and our military forces in general. In the study of history man can find the flaws and the errors which not only contributed to wars in the first place, but which also helped one side achieve victories in the actual fighting. It should not be the sole purpose of the historian to gloss over the victorious achievements without presenting the struggles, the ramifications, the flaws and the errors inherent in all battles in which man is involved.

With the conclusion of this article, we have come to the point of actual combat operations of the air arm of the United States in World War I. The editors are aware that much personal history will be forever lost if a few of the remaining "old timers" are not now willing to produce some personal memoirs or reports. Certainly the first-person recording or telling makes far more interesting reading than a dispassionate third person approach. The Editorial Board of The Air Power Historian *hopes that it will be able to secure some firsthand accounts of the war and the fighting, as well as other ramifications and details.*

AMERICAN DAY BOMBARDMENT *in World War I*

By BRUCE C. HOPPER

Before joining the Air Service, U. S. Army, Bruce Hopper had served a number of months in the American Field Service, in camions, with the French Army. When he was enrolled in the 96th Aero Squadron, he was already wearing French wings, which he had won after training in Caudrons at Tours. While with the 96th he was to pile up probably the greatest number of bombing missions flown by an American pilot in World War I. He was also destined to be the historian of day bombardment by United States forces in that war. The following is an excerpt from an unpublished volume, "When the Air Was Young: American Day Bombardment, A.E.F., France, 1917-18," which was hastily written in 1918 immediately after hostilities. The only part of the volume previously published is Hopper's paper on bombardment tactics, which appeared without his name as an Air Service Information Circular after the war.

In his preface to "When the Air Was Young," Hopper wrote: "The following narrative is not a history worthy of the gallant pioneers of American daylight bombing operations. . . . The A.E.F. was not history-conscious—until after the Armistice. Records were especially meager in the Air Service. The original of this account was prepared on the spot by a participant, as a labor of love and largely from memory. . . . The result was a rather pathetic monument to shortsightedness in history preparation. . . ."

During World War II Bruce Hopper stayed out of uniform but served as Historian, Eighth Air Force, and Historian, U. S. Strategic Air Forces in Europe, after a period with the O.S.S. in Sweden. He is a professor of Government and International Affairs at Harvard University, where he has been on the faculty since 1925.

When the 96th Aero Squadron was formed at Kelly Field, San Antonio, Texas, August 20, 1917, it was just like all other infant organizations of the rapidly growing Army; it had no definite conception of what lay in store, whether it would be among the fortunate units to be sent across the water for immediate service in the field, or be retained for equally important but less stirring duties at some home flying field. Not one of the successive commanding officers, not any of the enlisted men, who had come in a body from Fort Slocum, could have prophesied the particular work laid out for the squadron in the war — the coveted honor of being the first squadron of the American Air Service to carry bombs over the lines, and for months the only squadron in active bombing operations against the enemy.

During its stay at Kelly Field the squadron was thoroughly drilled every day, and given considerable fatigue duty to harden the men. The organization was threatened with complete disruption by a severe attack of ptomaine poisoning, which put half the personnel in the hospital, but which did not result in any deaths. On October 9, 1917, the squadron, commanded

by Captain George C. Thomas, Jr., A. S., U. S. A., was ordered to the Aviation Concentration and Supply Depot at Mineola, N. Y., to be outfitted for overseas duty.

The voyage was made on R.M.S.S. *Adriatic,* leaving Pier 61, New York, October 27, and arriving in Liverpool, November 10. The squadron was then ordered to southern England for six months' training. Upon arriving in Southampton a change in orders caused immediate departure for France, where the squadron was stationed at the 7th Aviation Instruction Center, Clermont-Ferrand, Puy-de-Dôme.

As a pioneer squadron in the new school of bombardment instruction, the 96th was given complete control of the hangars, transportation, and armament, and assisted in organizing the systems of management [which are] still in force. The mechanicians of the squadron acquired a complete knowledge of the Bréguet day bombardment plane and of the Rénault motor by daily visits to the nearby Michelin factory where the planes were assembled. The experience thus gained by assisting in the construction of the planes and assembling the Rénault motors in the factory proved of immense value when the squadron was sent to the Zone of Advance. Throughout seven months of operations at the front the mechanical personnel of the 96th kept a maximum number of planes in commission. When hard put for spare parts, use was made of French farming implements for such repairs as broken tail skids and longeron braces, showing the ingenuity developed by factory study of Bréguet construction.

The 96th was ordered to Amanty field, near Gondrecourt, May 18, 1918, and became established as a bombing unit in active service against the enemy. The flying equipment of the squadron consisted of ten old instruction bombing planes, type Bréguet 14-B2, with 300-horsepower type 12 F.E.V. Rénault motors, which had been transferred by the 7th Aviation Instruction Center. The planes were in very poor condition, having been used for instruction since December 1917, and were in constant need of major repairs even before used as bomb carriers. Major H. M. Brown, A. S., U. S. A., squadron commander, ordered the engineering department to have the planes ready for active operations within two weeks after arrival at the front. This was accomplished under the able direction of Master Sergeant-Engineer James Sawyer by robbing parts from old worn-out farm machinery discarded by French peasants in the vicinity of the airdrome. Part of a weather-beaten harvester was used for a tail post on one of the planes; wagon tires were cut up and used for tail skids, and pieces of an ox-cart tongue were employed to reinforce the wing spars on several planes. One of the planes carried brace wires which had once served on the telephone line of communications. Plane No. 4014 was crashed in a bad field and was salvaged for spare parts. Every one of the remaining nine planes, when put on the available list, carried some part of plane No. 4014, and thus the squadron was able to operate long before spare parts from the supply depot at Colombey-les-Belles were obtainable.

First Raid

The first bombing mission undertaken by the 96th was an event which excited great interest in the sector. Late afternoon of June 12, 1918, found eight planes loaded with bombs and ready for the long-anticipated raid to a hostile objective, in this case Dommary-Baroncourt. General Trenchard, commanding the British Independent Air Force in France, was present with

several members of his staff; also a number of officials representing British, French, and American aviation. The squadron was practically without precedent for guidance, as it was isolated from other flying squadrons and had only two pilots on the rolls who had ever crossed the lines. Pictures were taken of Major Brown and the pilots and observers scheduled to make the raid.

At 4:20 P.M. the flight took off, Major Brown leading, with 1st Lt. Howard G. Rath acting as his observer. Owing to the worn-out condition of the motors, considerable time was spent in attaining a bombing altitude of 4,000 meters. The objective was reached without mishap, save that two planes were forced to return because of motor trouble. The squadron's baptism of anti-aircraft fire was received over Étain. The "Archies" were particularly active and accurate over the objective. Lt. Rath bombed into the wind and scored a good hit. Bursts were observed in the railroad yards, and the trail of bombs, 640 kilos in all, extended to the warehouses beyond the tracks. No photographs were obtained. The formation was attacked on the return flight by two enemy scouts and one biplane fighter. The pilots closed in and held a tight formation, however, and the observers were able to beat off the attack after crossing our lines. One of the planes, piloted by 1st Lt. Charles P. Anderson, received two explosive bullets in the motor but was able to reach the airdrome. Three planes were forced down with empty gasoline tanks, but all landed safely. The other three arrived at the airdrome at 8 P.M. That night the entire squadron joined in a camp jubilee to celebrate the unqualified success of the first American bombing raid. . . .

Equipment Old and New

The first big loss to the 96th came on July 10, when a formation of six planes, led by Major Brown, was forced down in hostile territory. All day the weather had been extremely unfavorable, but the clouds seemed to lift in the late afternoon. The formation left the airdrome at 6:05 P.M., and was almost immediately swallowed up by the descending clouds. A strong southwest wind swept the planes northward, but the sky did not completely close until an hour after the take-off. It is supposed that the leader was unable to find the objective on account of the storm, and unable to recross the lines against the wind before the gasoline gave out. A German wireless message was intercepted that night, which stated that five American bombing planes were forced to land near Coblenz. The next day the sixth plane was heard from, also in German hands. All the pilots and observers were reported safe.

The command of the squadron devolved on Captain James A. Summersett, Jr., until the arrival of Major J. L. Dunsworth, July 16. For two weeks the squadron had two planes on hand, with one available for duty. This last plane, No. 4018, known as No. 18 in the squadron, has had a remarkable history. It was used for instruction purposes for six months at the 7th A. I. C. before being sent to the front, where it became a favorite of flight leaders. No. 18, piloted by Major Brown, was the first plane to cross the lines carrying bombs on an American air raid. It was also the first plane to carry the squadron insignia, of a devil throwing a bomb, designed by Lt. Clapp. The plane was out of commission with broken wings when Major Brown led the formation

NATIONAL ARCHIVE

Old No 18. This is the Bréguet 14-B2 in which members of the 96th Aero Squadron flew 270 hours, 100 of which were bombing missions over the German lines. No pilot or observer was ever killed in No. 18, though at one time or another nearly every part of the plane was riddled by enemy bullets and shrapnel or damaged in rough takeoffs and landings.

into Germany, July 10, and it thus escaped capture. On September 13, No. 18, piloted by 1st Lt. Charles P. Anderson, broke its propeller on the take-off and was forced to land in a near-by field. Of the three planes able to continue the flight, two were shot down, one in flames. On September 16, Captain David H. Young attempted to fly No. 18, but the hood flapped back before taking to the air. On this raid all four planes in the formation failed to return.

The curious good fortune of No. 18 was a constant cause for wonder in the squadron. Although still serviceable when the Armistice was signed, it carried no less than 110 black crosses, earned for that number of bullets and shrapnel hits. On one raid the whole right side of the fuselage covering, from the pilot's cockpit to the rudder post, was torn open with shrapnel. The tail section was replaced three times, the lower wings six times, the upper wings twice, and the landing carriage twice. The only portion of the original plane left intact is the fuselage from the observer's cockpit to the engine bed. No pilot or observer has been killed in No. 18, although a wounded pilot, 1st Lt. A. H. Alexander, brought his wounded observer, 2nd Lt. J. E. McLenan, back to the field in it after a hard fight, September 4. No. 18 has a record of 270 hours in the air, 100 of which were over the lines. It is treasured as the first and

most lasting flying equipment used in operations, and is the object of considerable squadron sentiment.

During the third week of July, eleven new Bréguets, including two *corps d'armée* types, with photographic equipment, were delivered to the squadron. Many practice formations and bomb tests were held on flying days, while the engineering department prepared the planes for duty over the lines. Replacements of pilots and observers had arrived, so that the squadron had sixteen teams available for duty. . . .

St.-Mihiel Offensive

During the fourteen flying days of August 1918, the 96th carried out twenty successful missions, dropping 19,480 kilos of bombs. Precision bombing attained a high efficiency among the leading observers, so that good hits were the rule. The average number of planes available was ten; the loss in planes was two. Tunnel guns were installed for the observer to use in case of an attack from under the tail. Apparatus was installed with which the bombs could be released by the pilot, thus enabling the observer to give his attention to reconnaissance or fighting off enemy airplanes. The end of the month found the squadron well supplied with the latest equipment and prepared to continue the record-setting pace in number of raids per flying day.

Flying with the 96th was a much-appreciated privilege before the St.-Mihiel offensive. The sector had been quiet for nearly two years and, although the anti-aircraft batteries around such objectives as Conflans and Audun-le-Roman were uncomfortably accurate, the enemy scout squadrons were very cautious and seldom attacked save when greatly superior in numbers. Moreover, the flying personnel of the 96th was eager to prove worthy of the honor of pioneering American aerial bombardment in the war, and put forth its greatest efforts to attain a reputation as a hard-fighting unit.

On non-flying days the pilots and observers assembled in the intelligence office for systematic map drill and to discuss the best type of formation to fly for defense against enemy scouts. The constant search for the best method of doing everything was not without results, and the spirit to improve over the old was so contagious that a good-natured competition sprang up between the squadron members as to which pilot or observer could do the most to remedy apparent faults or suggest new benefits. The rumble of the memorable barrage announcing the St.-Mihiel drive was welcomed by flyers and mechanicians of the 96th, for they were ready and eager to carry on.

Two formations on September 2 to Audun-le-Roman and Longuyon were pursued to the lines by four enemy planes each. New markings on enemy planes began to appear. On this day the enemy scouts, Pfalz type, and very fast in manoeuvers, had brown bodies with white and yellow tails. They were more persistent in their attack, and seemed to have an organized system of darting in close while protecting each other. Longuyon and Conflans were the objectives bombed on September 3. Of the five Pfalz which attacked on the return flight from Conflans one was brought down in flames over Hannonville.

September 4 marked the first serious casualties of the squadron. A formation of eight planes bombed the railroad yards at Conflans and was thoroughly grilled by the "Archie" batteries. When the flight leader, Lt. Gundelach, signaled to turn beyond

the objective he noticed five Pfalz planes headed toward the lines in climbing. Immediately he changed direction to fly straight into the sun, and the leading observer fired the six red flares to signify "Enemy planes, close in." The enemy planes were from a much-dreaded squadron whose markings were a red nose, white tail, and mottled brown fuselage. The enemy pilots concentrated their efforts to break up the Bréguet formation by attacking from all sides. The observers were on the alert, however, and beat off the first rush easily. The combat then settled down to a running fight with the scouts diving in to fire their bursts, then zooming back to positions above and behind the formation. When the first formation of scouts, five in number, quit the combat, the observers were given a recess of three minutes. Other specks coming from the clouds were first thought to be Allied pursuit planes, but when they dived, guns wide open, the observers realized that the attack was being continued by another flight from the same red-nose squadron.

The attack was highly organized and continued as far as Verdun. One of the second five enemy planes was shot down out of control and crashed in the vicinity of Friauville. 1st Lt. Arthur H. Alexander, pilot, was shot in the small of the back and, though weakened from the loss of blood, managed to land his plane at the airdrome. His observer, 2nd Lt. J. E. McLenan, was wounded in four places in the legs, one ball severing a small coin in his pocket and carrying the fragments through the wounds. 1st Lt. D. D. Warner received a bullet in the hip, which shattered his thighbone. 1st Lt. Avrome Hexter was wounded in the head, the bullet tearing a furrow above his eyes.

The battle was a victory for the 96th; one enemy plane was brought down without fatal casualties to the squadron. The incident served to diminish greatly the fear of the fast enemy scouts, as they had been met and defeated in a forty-minute combat with the advantage of numbers in their favor. The pilots acquired the art of holding tight formation during a running fight, all the while zooming and diving in constant relative position to each other. Manoeuvering when under fire had the double purpose of permitting the observers to get in point-blank bursts and making it impossible for the enemy planes to keep the Bréguets in the dead center of their gunsights.

September 12, which opened the great St.-Mihiel offensive, was on all counts the worst flying day in many months. A high southwest wind made formation flying extremely dangerous, and the low fast-moving clouds made it impossible to see more than two or three kilometers. In the morning the cloud ceiling was very low, but the afternoon brought clear spaces with no decrease in the violence of the wind.

The first mission undertaken was a solo raid by Lt. André Gundelach, pilot, and 2nd Lt. Pennington Way, observer, who left the airdrome at 10:45 A.M. The objective was Buxières, where hostile troops were concentrating. Lt. Gundelach's plane carried thirty-two 90-millimeter personnel bombs, a record load for a Bréguet in the fairest of weather. The plane did not return and was later reported to have come down in flames south of Commercy. Lt. Gundelach jumped; his body was found at some distance from the wreck. Lt. Way was burned to death. As no bombs were found in the wreckage, it was presumed that the mission had been ac-

complished.

At 1:30 P.M. eight planes, led by Captain D. H. Young, bombed the troop center at Buxerulles. The formation crossed directly over St.-Mihiel at 2:15, at 700 meters, but did not draw a single shot from the anti-aircraft batteries, showing that the withdrawal from the salient had already begun. The objective seemed to be deserted and in ruins. A perfect hit was made, the bombs cut a trail through the town.

The third mission of the day, a formation of five planes led by Captain James A. Summersett, was to bomb the troops at Vigneulles. Owing to the lateness of starting, 6:35 P.M., the objective was not reached until after dark. The bombs were released over the town, but observation of the hits was impossible. The formation returned to the airdrome in the darkness, the pilots guiding on the exhaust fires from the motor of the leading plane. Landing at the field was attempted with the aid of ground flares, but only one of four planes landed successfully. One plane crashed in the forest back of the hangars; the other two piled up on the field. The fifth plane, piloted by 1st Lt. Ed Cronin, crashed on a ploughed field near Gondrecourt. The pilot was killed. The observer, 2nd Lt. L. C. Bleeker, was uninjured.

The end of the first day found the squadron badly crippled, having lost three of the personnel killed and eight planes wrecked or put out of commission. The clinging mud of the field caused many broken propellers, and the high wind made it necessary for the mechanicians to hold the wings while the planes were taxied to and from the starting line. During the day many refugee planes landed because of the terrific wind. One Salmson, in attempting to land near the hangars, drifted into two Bréguets loaded with bombs. All three planes were completely wrecked, but fortunately the contact bombs did not explode.

The morning of the 13th dawned wet and cloudy, with a treacherous wind still blowing and five lonesome Bréguets on the alert at the 96th hangars. At 3:15 P.M. the five available planes were ordered out to bomb the roads between Chambley and Mars-la-Tour. Four planes left the ground, but one was forced to land in a near-by field. The other three continued the mission and bombed the troops along the road designated from an altitude of 1,000 meters. The planes were surrounded at the objective by fifteen enemy scouts. In the fight which ensued, two planes were shot down. 1st Lt. F. Farnsworth, pilot, and 2nd Lt. R. E. Thompson, observer, went down out of control. 2nd Lt. S. Hopkins, pilot, and 1st Lt. R. B. Williams, observer, went down in flames. Lt. Gaylord and Lt. Rath, pilot and observer, managed to cut their way to the lines and landed safely at the airdrome. One enemy plane was shot down in the combat.

The losses of the first two days in no way disheartened the flyers of the 96th. Ten planes were ready for the first raid in the morning of the 14th. The formation, which left the field with Captain Young in the lead at 6:40 A.M., dwindled to three planes before reaching the lines north of Verdun. In spite of such meagre support, Captain Young continued his course to the objective, Conflans, which was concealed by several layers of clouds. A favorable opening permitted the formation to descend below the clouds, and the leading observer, 1st Lt. S. M. Lunt, scored a perfect hit at the neck of the railroad yards.

Enemy scouts began to appear before the objective was reached. 1st Lt. B. C. Hopper, pilot of the photographic plane, manoeuvered over the city while his observer, 1st Lt. A. H. Kelly, obtained pictures of the bursts. Hide and seek in the clouds with twenty enemy planes was the game for the next half hour. The third plane, 1st Lt. Charles P. Anderson, pilot, and 1st Lt. Hugh Thompson, observer, closed in abreast of the other two, allowing the three observers to keep up a constant fire with tourelle guns while the pilots manoeuvered in and out of the cloud alleys. All three planes landed safely at the home field. Two other missions were carried out that day, bombing successfully the troops on the roads between Vittonville and Arnaville on the Moselle River. The bridge at Arnaville was bombed the next day, and Longuyon on the 15th and 16th. Enemy planes were encountered, but their attacks were not persistent.

Conflans was successfully bombed in the early afternoon of the 16th. A third formation was sent to bomb Conflans at 5:00 P.M. Four planes remaining in the formation after crossing the lines were seen nearing the objective but did not return. They have never been heard from. The missing pilots were 1st Lt. Charles P. Anderson, 1st Lt. Raymond C. Taylor, 1st Lt. Charles R. Codman, and 1st Lt. N. C. Rogers; the observers with them were 1st Lt. Hugh Thompson, 1st Lt. W. A. Stuart, 1st Lt. S. A. McDowell, and 2nd Lt. K. P. Strawn.

During the entire St.-Mihiel offensive, the squadron was operating under the most discouraging conditions of adverse weather and shortage in planes and flying personnel. The losses in four days were sixteen flyers, including 1st Lt. James A. O'Toole, who was assigned to detached duty as a courier, and fourteen planes destroyed in combat or forced down in hostile territory. The big lesson learned from the many combats with Germany's ace squadrons, which had been moved to the sector, was that big, tight formations were necessary to successful bombing operations. The heavy losses were due to small formations of three or four planes being completely wiped out. A large formation, with a tight rear line, attains a degree of self-protection.

The squadron continued to operate from the Amanty field, dropping propaganda as well as bombs, until September 23, when the First Day Bombardment Group was moved to Maulan, near Ligny-en-Barrois, to prepare for the Argonne drive.

The Argonne Offensive

The first raid of the Argonne offensive was a mission to Dun-sur-Meuse, carried out with success. The formation of six planes was attacked by ten Fokkers and Pfalz. Two of the enemy planes were shot down out of control between Cléry and Cunel. 2nd Lt. P. J. O'Donnell, observer, was killed in the combat. Étain was bombed just before dark, September 27, by a formation of 12, all of which returned safely. A total of 2,400 kilos of bombs were dropped on this raid. On September 29, a highly successful raid was carried out with Grandpré as objective. Thirteen planes reached Grandpré, dropping 1,600 kilos of bombs. For the first time since the squadron had been operating, the pursuit planes cooperated closely with the bombers. The protection afforded by pursuit planes, though often of an indirect kind, was of immense value for precision bombing. The observers were able to make careful calculations

regarding the wind and other factors upon which accurate bombing depends and were more certain of doing their best work if undisturbed by the enemy scouts.

The 96th had plenty of planes but was short of pilots and observers to carry out the operation orders on a large scale. Accordingly, flying personnel was borrowed from the 11th and 20th squadrons. The formations would leave the ground numbering seventeen to twenty planes and, allowing for motor trouble and other difficulties due to difference in range of speed, there generally would be a tight formation of twelve or fourteen planes when the objectives were reached. The success of the big formation, in spite of the prevalent idea that a six-plane formation was best, did more to raise the spirits and courage of the squadron than any incident in its history. When attacked the planes could form a tighter fighting rear line than in a small formation, and often the sight of a well-organized large formation was enough to warn enemy scouts of the hot reception to expect should they attack. It was the custom for wounded pilots, or pilots whose observers were wounded, to fly either over or under the leader, and thus enjoy the protection of the entire formation. In a small formation two or three severely wounded observers eventually leads to the complete destruction of the whole flight if the attack is organized and persistent.

One of the first successes with the large formation was the bombing of Bantheville, October 1, with thirteen planes in *vol de canard*, Lt. Hopper, flight leader, Lt. Kelly, leading observer; 1,240 kilos of bombs caused much damage in the town, starting three fires with the incendiaries. On October 2, fourteen planes dropped 1,220 kilos of bombs on Cornay with good results. Eight enemy planes attacked before the lines were recrossed; one of our planes went down, but reached Allied territory, bringing down one enemy plane in the descent. October 3, 1,520 kilos were dropped on Grandpré. Eight big bursts were observed in the town, four in the railroad yards; three fires were started by incendiaries. Dun-sur-Meuse and Landres St.-Georges received 1,160 kilos of bombs each on October 4; fires were started in each town; the hits were in dead centers of the town and trailing to the outskirts. Combats were fought on each of the raids for the day. Fifteen enemy planes, Pfalz, attacked over Dun-sur-Meuse and continued the fight for twenty minutes. One of our planes, 1st Lt. Joseph B. Pearson, pilot, of the 11th, and Pvt. C. J. Newby, observer, went down with white smoke issuing from the motor. Although closely pursued by two enemy planes, Lt. Pearson escaped; both he and the observer were wounded. All our planes were badly shot up. In the fight over Landres St.-Georges, against thirty enemy planes, the 96th did not lose a single plane, but brought down two of the enemy. When the fight was at its height, a group of American pursuit planes arrived and mixed with the enemy in a free-for-all dog-fight. The Spads claimed eleven of the enemy.

Bombing during the early days of the Argonne drive was extremely precarious because of low clouds. It was necessary to fly at least 500 meters below the cloud ceiling which varied from 1,800 to 2,200 meters, to avoid offering a perfect target for the "Archies." The clouds, too, made wonderful lurking pockets for the

enemy scouts.

Landres St.-Georges was again visited by a large formation, October 5, and Bantheville, October 6. Fires and explosions were caused in both towns by the bombs. October 10 was a two-raid day, one on which Milly-devant-Dun was bombed through the clouds, and the other to Dun-sur-Meuse proper. A brief wet period succeeded these flying days, giving the squadron a much-enjoyed rest.

October 18 is one of the record dates in the annals of the squadron. A formation of fourteen planes, led by Lt. Hopper, reached its objective, Bayonville, with all its planes and trailed its bombs through the center of the town and to the roads beyond. Lt. Col. Thomas S. Bowen, commander of the group, was on this raid as observer and joined in the fight which ensued. Sixteen hundred kilos of bombs, including forty of the new incendiaries, were dropped. According to intelligence reports from French sources, 250 men were killed and 700 wounded on this raid. Fifteen Fokkers and Pfalz were encountered, but their attack was not well organized. One Fokker attacked the leader from off the right wing (a blind spot on the Bréguet) and managed to escape by diving under the right side of the formation line.

The highly satisfactory raid to Bayonville was the last of the big formations. From then on to the Armistice operations, the formations which reached the objectives were dangerously small in view of the large number of enemy scouts constantly on the alert. The shortage of planes, due to forced landings around the sector, was the chief cause for the return to small formations. On October 23, Captain Belmont Beverly led a formation of seven planes to Bois-de-la-Casine. The formation was attacked by twelve Pfalz and Fokkers and succeeded in bringing down two of the enemy. One of our planes had its gas tanks pierced and was forced to land at Clermont, where it crashed.

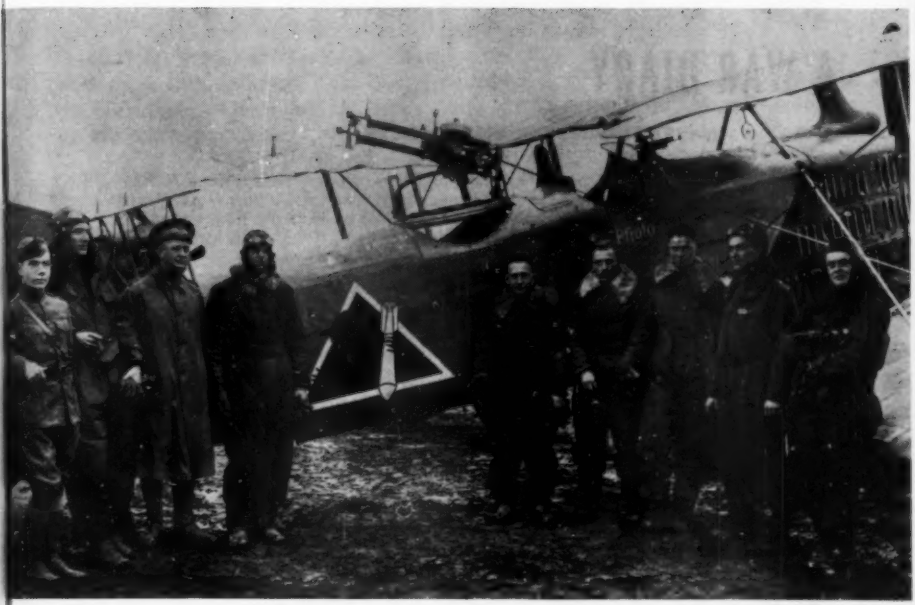
The next big fight was over Briquenay, when a formation of ten planes, led by Lt. L. F. Turnbull, encountered six Fokkers and brought down one. 2nd Lt. Walton B. Teneyck was wounded in the shoulder and arm but managed to land his plane safely. 1st Lt. H. L. Pancoast was shot through the stomach and lung; his pilot landed near a hospital back of the lines. Two of our planes had forced landings near the Argonne forest. The 96th brought down two more enemy scouts, out of fifteen encountered on a raid to Damvillers, October 29. 1st Lt. Gilbert Stanley and 2nd Lt. H. T. Folger were wounded in the combat and forced to land at a hospital near Verdun. On October 31, Tailly was bombed; enemy planes were seen but not encountered.

The bridge at Stenay was the objective, November 3, but the results of the bombing could not be observed due to the cloud banks. A second raid was carried out that day to Beaumont, where good hits were made in the town.

The last fight of the 96th proved to be the hottest of its many encounters with enemy airplanes. A formation of five planes bombed Montmédy, where photographs taken show bull's-eye hits. Fifteen Pfalz attacked before a turn could be made at the objective and continued to harass the formation for twenty minutes. The leader, Captain Young, manoeuvered his plane so skillfully, with the rest of the formation following close, that the enemy could not find a steady target. Our observers brought down two enemy planes, one in flames. 1st Lt. H. J. Spaulding was shot through both

Flight
Bar-le
armar
Arthu
Samu
Rath,
A. Su
nose-t

hand
Paul
wires
landi
Elliot
and
enem
McD
penet
out i
by al
sisten



AIR FORCE PHOTO

Flight leaders and staff of the 96th Aero Squadron, U. S. Army Air Service, at Maulan, Bar-le-Duc (Ligny-en-Barrois), November 12, 1918. Left to right: Lieut. Vivian F. Ludden, armaments officer; Lieut. Bruce C. Hopper, flight leader; Dr. Lee, squadron medico; Lieut. Arthur Kelley, leading observer; Lieut. Avrom Hexter, observer and supply officer; Lieut. Samuel Lunt, leading observer; Capt. David H. Young, flight leader; Lieut. Howard C. Rath, operations officer, 96th Squadron and 1st Day Bombardment Group; Capt. James A. Summersett, Jr., C.O., and former flight leader. Note the well-known insignia—the nose-thumbing, bomb-throwing red devil in a white triangle—and the word "Photo" stenciled on the fuselage.

hands. The plane piloted by 1st Lt. Paul Lakin had its elevator control wires shot away, forcing a dangerous landing at Belrain. 1st Lt. Robert Elliott's plane was also badly shot up and forced down at Clermont. An enemy bullet whipped off 1st Lt. Harry McDougal's goggles and four others penetrated his fur combination without injuring him. The fight was voted by all as the fiercest and most persistent to the credit of the 96th and worthy of being its last and final stroke in the war.

Bad weather prevented further flying for several days, although the squadron remained on the alert. On November 11, the signing of the Armistice put an end to the alerts, but the squadron continued to fly formations and practice aerial manoeuvers while awaiting orders to proceed north or, better still, to turn in the flying equipment and go home.

A WAR DIARY

By LIEUTENANT ROLAND R. BIRNN

This is the final part of the War Diary of Lieutenant Roland R. Birnn. Part I was presented in the October 1956 issue, while Part II was presented in the January 1957 issue. The Diary was given to the Foundation by Lt. Birnn's father, Col. Roland Birnn, USAF (Ret.), Clearwater Beach, Fla.

Charters Towers 5 May 1942

Came back here today exhausted. Guess they never heard of pilot's fatigue. I think I have it.

Rose went out today to locate carrier and send a homing signal so B-17's could bomb it. He located the carrier, stayed near it for better than an hour, but B-17's never came. They didn't get out of Townsville. Too bad—it was a grand opportunity for the big boys.

Charters Towers 6 May 1942

No rest for the weary. Went down to Charleville today and brought back a plane. Landed after dark. No fun flying in a blacked-out country after dark with no navigational aids.

Charters Towers 7 May 1942

This takes the cake. Got up at 3:15 A.M. to run another recon from Townsville. Don't know how much more I can take before I crack.

Charters Towers 8 May 1942

Off on another recon today—8:00 hours of open water flying. With so many pilots around, why do three of us do all the recon flying? Perhaps when we wear the ships out we'll get a rest.

Walker just got chased by Zeros from Lae to Moresby. He was badly shot up and crashed on a reef. The ship caught on fire but he managed to pull his C-P and two gunners out. The two gunners died. His one hand was badly cut. He got a D.S.C. for that—he earned it.

Charters Towers 9 May 1942

Something must be wrong. The sun is up and I haven't been given a mission.

My mission was a little late; it came at 5:00 P.M. Someone sighted an unknown carrier, so I'm ordered out to look it over—some job for darkness and bad weather. I had to return before finding the carrier because of motor trouble. I hate to have motor trouble foul a mission after I'm on it. It would have been pleasing to have it develop before take-off. That wouldn't upset my rest too badly.

Charters Towers 10 May 1942

Another recon from Townsville. I was up at 3:00 A.M. as usual and flew for 8 hours. I think I'll set a record for continuous flying.

Charters Towers 11 May 1942

Going to Moresby today to arrive at dark for a recon flight tomorrow morning. I'm the number one man in the Squadron in flying time.

Port Moresby 12 May 1942

Flew a recon to Lae, New Britain, Bougainville, Woodlark and back to Moresby—1600 miles. Saw nothing new.

Port Moresby 13 May 1942

Flew a repeat of yesterday; total time 12½ hours. Weather fair with

a few scattered clouds. Not enough for cover. Saw nothing new. Been kind of leary of Lae since I got jumped there by five Zeros. Go over at 16,000 feet. Gives me a little better chance to get away.

Port Moresby 13 May 1942

Part of this recon covers an island just east of New Ireland. This territory is heavily occupied and under continuous Jap patrol. It's a poor place to be caught in a clear sky. When the skies are cloudless I approach with caution; I don't take foolish chances. The Zero is well armed and is plenty fast. To be caught here with no cloud cover could easily prove a suicidal venture. We'd get no profit from that.

I'm getting a little tired of this run, I've made it on four previous occasions. But they're never the same; the weather and the enemy see to that.

Got back to Moresby, gassed and took off for Charters Towers. Got here plenty tired.

Still no promotions. They're getting them in the States and in rear echelons. They might let a few of them leak through to those who are doing the fighting. But it doesn't seem to work that way.

Charters Towers 15 May 1942

Off again this time for some fun. We're going to do a bombing mission on Lae. Taking off at dawn tomorrow. B-26's will strike first. Arrived at Moresby at dark.

Port Moresby 16 May 1942

Didn't get away at dawn, weather too soupy. Left at 8:00 A.M., crossed mountains to the south and tried to get to Lae, which was socked in. Finally found a passage on the shore line, got a look at Lae but couldn't make a good visual bombing run. Don't think we did too much damage. Saw some Zeros take off to meet us, but they never engaged.

Moresby 17 May 1942

Spent the night at Moresby and took off for Charters Towers at dawn. Arrived O.K.

Charters Towers 18 May 1942

Good deal—going out to a ranch for a few days rest. Sure can use—only got 120 hours in last 28 days—mostly combat. While combat doesn't worry me, it sure wears me down. I don't lie awake after a mission has been flown, but I sense that they fag me down. I can easily see how one's nerves can crack. Some of the boys worry a lot and you can see their mental attitude changing. I try not to think of things that have happened. When a bad experience is over, it's over, and is best forgotten.

I have already lost two of my best friends but I try to keep that out of my mind. War is hard enough when you keep looking ahead; it's worse if you keep refreshing memories of past misfortunes.

The worst part of a mission is the approach to the target; that's when the cold sweat breaks out. Later you're too busy avoiding pursuit and getting away. The pursuit attack doesn't scare you—it's too impersonal. I never think that one of the bullets being aimed at my ship could hit me. It's probably a protective attitude that nature gave us.

However, I'm ready for my rest tour on a ranch. This ranch is owned by Mr. McConechy. When we arrived I was surprised. I expected to rough it. But what a place—comfortable beds and delicious meals. Mr. "Mac" said he didn't have a large place, only 700,000 acres — 1091 square miles.

We went riding and hunting at our

leisure. No limit on ducks, pigeons, doves and wild pigs—and they were all good eating. He had a stable full of good riding horses.

We had a wonderful time—just what we needed. It sure did wonders for me. We had lots of fishing too.

Our party was composed of Lowery, Rose, Timlin, Dean and myself.

Charters Towers 23 May 1942

Back for duty. Lowery, Timlin, Keel, Dickinson and myself are going on another raid on Lae.

Took off from Charters Towers for Cooktown at 4:00 A.M. Never did get assembled—too dark. Gassed at Cooktown and took off for Moresby. Loaded at Moresby with one-half cluster incendiary bombs and the other half demolition. Went in low again. Capt. Lowery, who was leading, always goes in low. This low attack is bad; A.A. is very effective and enemy pursuit can intercept you a lot quicker.

We headed north and then came down the Markham Valley on our approach. We saw Zeros taking off before we got to the target. They came straight on to attack. The A.A. threw up a screen of fire right in front of us. This A.A. fire screen stopped before we got there. It would have been heavy fire to fly through.

About that time I noticed that Keel's right engine was streaming oil. Either a Zero or AA must have hit him.

When we had dropped our bombs we dove for the water. We leveled out and slowed down for Keel. There were 10 Zeros on us. Keel finally dropped behind and two Zeros got him. He was seen to smoke up and crash in the water just opposite Solomon.

A few Zeros continued the attack while the others flew on ahead to prevent us from heading into shore. One Zero climbed to about one thousand feet above us and dropped a huge aerial bomb. It went off right in front of our formation without doing any damage. It looked like a mammoth 4th of July fire display.

As we passed in over the shore at Buna Bay, this same Zero made a series of frontal attacks from treetop level. On one of these attacks his fire hit Dickinson right on the nose, stopping the left motor and killing his co-pilot.

We slowed up for him and he started climbing above us but, as he could not clear the mountains on one engine, headed back toward Buna Bay. We returned to Moresby.

This Zero was pumped full of lead and probably went down.

Moresby 24 May 1942

After spending the night at Moresby we loaded up with bombs and gas and returned to Cooktown. Here we are to form up with 6 other planes for another low altitude attack on Lae. This will make a force of nine as only three of us are left.

Cooktown 25 May 1942

Got ready to go. We like a dope got off the edge of the runway and got stuck up to the top of my wheel in mud. That put me out of this mission. It was a stupid stunt. We worked all day and got it off at 5:30 P.M. Will return to Charters Towers tomorrow.

Charters Towers 26 May 1942

Returned here today. Found everybody excited. Soon found out what the trouble was. Of those 8 ships that raided Lae, only three returned. A low altitude attack on a well defended target is not good. Our ships are too vulnerable to both the A.A. and to Zeros.

Charters Towers 27 May 1942

Talley, Timlin, Good were the only ones to return. They were jumped by 30 Zeros. Lowery and Wilson went down in flames. The formation was split up. Rulinson and Hesselbarth went into the clouds and didn't come out. Shearer also disappeared. The remaining three returned to Moresby. Talley's landing gear collapsed on landing. He brought in a badly shot-up plane. He had a bullet crease in his head. They're lucky to be alive.

Charters Towers 28 May 1942

Morale is low. The Lae mission was quite a blow. We are an old outfit and everyone knew each other very well. Col. Davies phoned General Brett and told him we needed him up here right away.

I got made operations officer. Really interesting in time of war.

Charters Towers 29 May 1942

General Brett arriving tomorrow. Hope he brings our promotions. That might help a little.

Charters Towers 30 May 1942

General Brett arrived. He made a speech for us. Also brought up a bunch of citations, those that have been in for a long time. Maybe we'll get some promotions, for those of us who live, if we suffer another Lae-type catastrophe. Guess it takes something like that to get action.

Charters Towers 31 May 1942

Attended a meeting with General Brett. He knows my father and asked if I might be his son. I replied that I was, and I hope that I registered my pride. He said that the group could send back a few of its most experienced crews to the States and that trained crews would come over from the States to replace them. I sure would like to go back. I feel that I've done enough for a while. If they keep us here long enough, no one will return. You can't stay in the thick of this battle for long and expect to survive—the odds are too strongly against you.

Rumors are floating around that everyone who was in the Philippines is going back to the States. That's too good to be true.

Charters Towers 1 June 1942

Well, I finally caught Dengue Fever. What a windfall. Sure I suffer from terrific headaches and all my joints ache, but I'm getting a rest.

They really take care of you here. It's an American Hospital and it really treats a patient as a patient. The nurses are really good. Not like anything I have ever seen.

Just heard tragic news—my airplane burned up on the ground. Really liked that ship—one of the fastest in the group. Also one of the best flying. Three of the men working in the rear were badly burned. Gas exploded around the rear turret when someone turned on the main line switch.

My gunner Swain is in the hospital here too. He has a bad heart. Too bad, as he's the best gunner we have.

Charters Towers 4 June 1942

Still in hospital. Just heard good news—Shearer and his C-P, Farr, are O.K. They were shot down on the raid where we lost 5 out of 8 planes.

Charters Towers 6 June 1942

Got out today. Weak and no appetite. You're no good for two weeks after an attack of Dengue.

Have an American café here now—serve real hamburgers that sure taste good. Only place in Australia to get them. The Aussies don't go in for good food.

Charters Towers 9 June 1942

Heard Rulinson's C-P (also shot down in the big raid) is O.K. He

parachuted. Maybe some of the others are still living.

Charters Towers 12 June 1942

No missions for the last week. They ran one while I was in the hospital, which was a flop. B-25's were supposed to go in first, bomb off to the side and draw the enemy pursuit away while the B-26's hit the field from low altitude. The B-26's were late and the B-25's, running from the zeros, passed near the B-26's coming in. The Zeros jumped the B-26's—they're a lot easier to shoot down. Our ships were shot up pretty badly—wasted a lot of planes.

Also the pursuit were supposed to be there to take on the Zeros. They didn't show up and the Zeros had a field day.

Shearer came back tonight. Looks bad. Had Dengue and they treated him for malaria. He said after his other engine failed, he hit the water. A Zero, with his wheels down, circled them, then strafed them a few times while they were swimming in the water and left. Didn't hit anyone. After that they swam to shore and some natives took them to a New Guinea Volunteer Riflemen's Camp at Wau. Twelve days later a plane came and picked them up.

Wau is only 60 miles from Solomon but the country is so wild that the Japs can't get in to take it.

These N.G.V.R.'s stalk the Jap fields and report everything that takes place. They have no radio, so make all of their reports by runners. They're a hardy group with lots of courage. They stalk right onto the Jap fields at night and get very reliable information. They help our operations a lot.

Wau is a modern town of 5,000 right in the mountains. It is a rich gold-producing region but can only be reached by air. The Japs have never bombed it.

The N.G.V.R. say that the crews of several of our crashed planes have refused to be rescued by natives. They were afraid of them. They should have been briefed that the natives here are friendly. Besides, in order to live, they had to take that chance.

Charters Towers 13 June 1942

Our group has done a pretty good job with these B-25's, which we had never flown until they were assigned to us here. So far we've shot down 24 Jap planes—these are all positives—the plane must be seen either to explode or crash. The probables are about 57 more.

Just got orders to Brisbane to pick up an A-20-A in about a week. I'll get another rest cure.

Flew down in the ship Talley had on the big raid. It was full of cannon holes and couldn't retract the wheels. It was a mess.

Brisbane 16 June 1942

What a fat-cat life for the lucky people that stay here all the time, and they complain. They should come up and do a tour in the combat zone. It would give them a little better sense of values.

Can't get any issue clothing—they say I have to buy it. They're still on a peacetime basis down here. I can't buy a new wardrobe every time I lose it to enemy action—they don't pay us that kind of money. I'll have to do more living in flying togs.

Flew an A-20-A for the first time in nine months. I had forgotten how easy that airplane is to fly, really maneuverable and fast.

Brisbane 25 June 1942

Flying down to Melbourne to ferry an A-20 back here to have guns installed. Going down in an A-20.

Melbourne 26 June 1942

Arrived here last night. Had a hard job getting a room. This is U.S. Army headquarters and, consequently, very crowded. They jam the movies.

Am flying an A-20 to Amberly at Brisbane today and coming right back to pick up another.

Just checked on our promotions. Found out that they promote a certain number in each group. We get the raw end of that one. Ninety-five percent of our group are old pilots, but we have to share promotions with the newest and greenest groups, regardless of length of service. It doesn't make any sense.

Went out to the airport to get our planes. They knew we were coming but the planes hadn't been touched. These planes were given to the Dutch in exchange for the B-25's we took from them. The Dutch gave them back to us—they don't like them. They are very funny people. They fired the guns on the A-20's and never cleaned the barrels. Now, three weeks later, they are ruined. We'll have to replace them all.

Australian mechanics never hurry. My booster was out and it took the day to get it replaced. Flew up to Sidney, landed after dark, and spent the night.

Brisbane 27 June 1942

Flew in here from Sidney this afternoon. Lucky to get away from Sidney while my plane was still flyable. They tore it down and it took most of the day to get it back in order. They dropped Hall's belly tank, so we had to drain it before we could hook it back on. Spent a gruelling day. But Sidney is a nice town—most modern town in Australia. Very different from the rest of Australia.

Melbourne 30 June 1942

Came back here today in a C-47. Arrived after dark. Bad as the worst—no heat. They charge you to build a fire in your room, if the room has a fireplace. Getting used to it now—sleep well in a cold room.

Sidney 1 July 1942

Arrived Sidney O.K. These A-20's are sure in bad condition. Saw a ferry pilot and sent my address home with him. The lucky dog!

Brisbane 2 July 1942

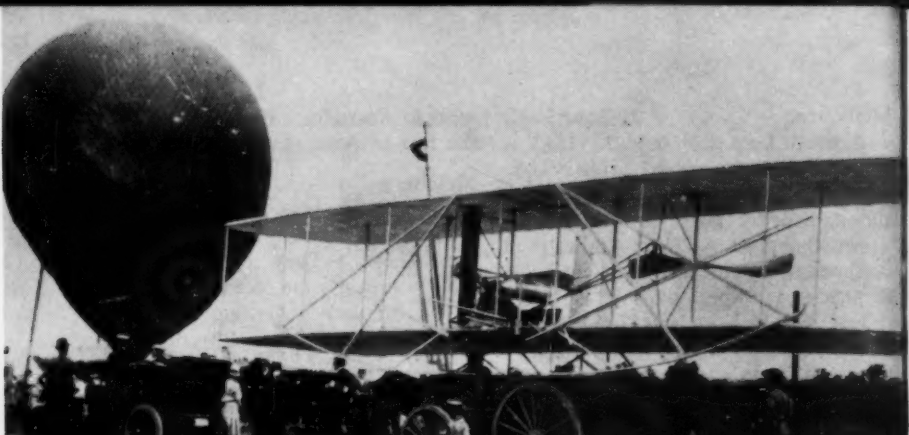
Arrived here late today from Sidney.

Keep hearing that the Japs wouldn't accept the surrender of Corregidor in P.I., 10,000 people there. Reports say they finally massacred all but 1500. If that is true, we might just as well acccept their rules of warfare. If they're going to shoot our men in parachutes, strafe us while we're in life boats or swimming in the water, there's no good reason why we shouldn't do the same. Guess I'm getting war-minded.

These A-20's are being fitted with 4 more fixed forward-firing guns, making a total of 8. It will be a powerful strafing ship. This addition will give it a total of 14 guns.

Am taking my ship out tomorrow for a final testing before heading back to the combat zone.

On 4 July 1942, while conducting final tests on his A-20 in preparation for returning to the front, the author, Lieutenant Birnn, crashed in Brisbane Harbor and was killed. The Diary he left behind is in its way a memorial to him and to his comrades, the men who truly fought and won the war.



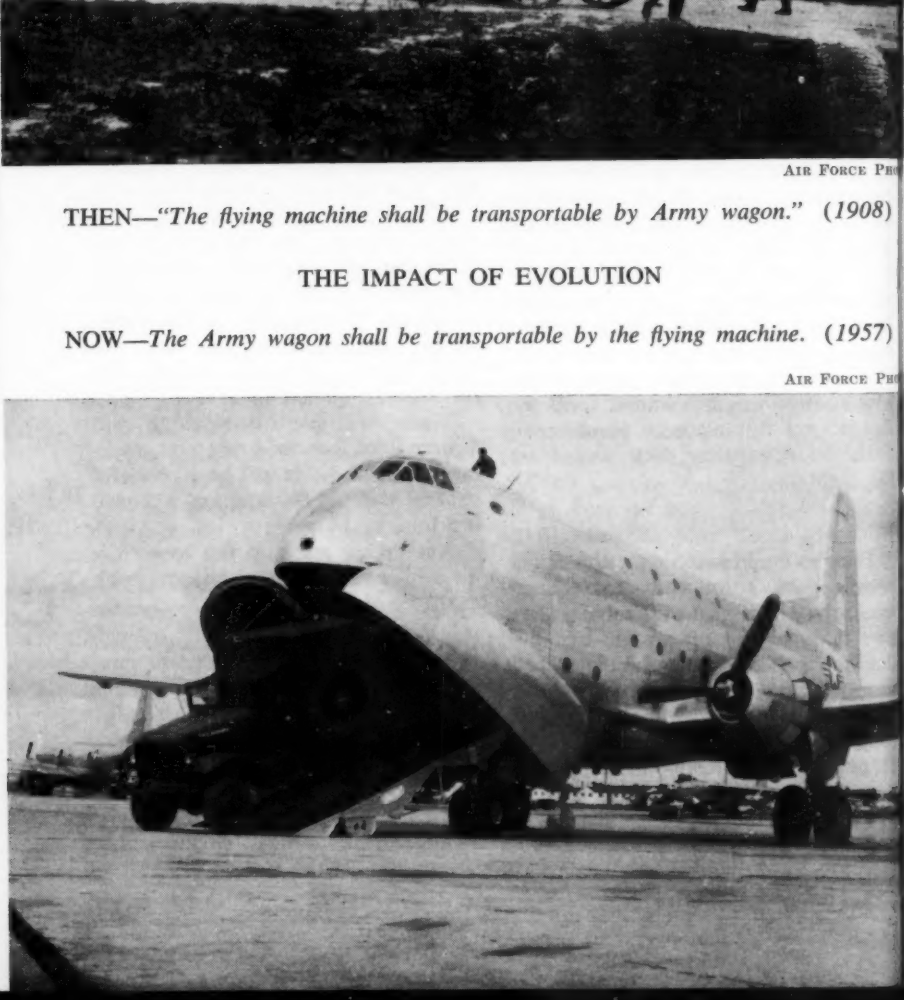
AIR FORCE PHO

THEN—*"The flying machine shall be transportable by Army wagon."* (*1908*)

THE IMPACT OF EVOLUTION

NOW—*The Army wagon shall be transportable by the flying machine.* (*1957*)

AIR FORCE PHO



SOME IMPACTS OF CHANGE

By MAJOR GENERAL ORVIL A. ANDERSON, USAF (*Ret.*)

History records that primitive man lived a very simple life. His wants were limited and meager. He was basically self-supporting in providing those wants. He was almost wholly independent of his neighbors. Where community life was practiced at all the community centers were small and widely dispersed. Primitive man with his structures would have made a highly unprofitable target for the present atomic bomb.

Evolutionary processes have advanced this primitive man to the modern civilization of today; a civilization characterized by densely populated concentrations of industrial, economic, and transportation centers; and a social and economic order in which man has become almost totally dependent on these structures for maintaining his way of life.

In this evolutionary advance of civilization the technological growth and expansion of man's means of transportation has played a singularly significant role.

As man sensed a need for better means of travel over the surface of the earth, either for himself or for his products, technology in the form of invention or design has responded, sometimes in a sluggish and time-consuming manner, either by improving existing vehicle types, or by the creation of new and original vehicular means.

In the evolutionary advance of means of transportation certain vehicular creations have effected changes in man's activities of revolutionary magnitude. The introduction of mechanized power to the wheeled vehicle had this magnitude. It set the stage for expanding both the political and economic structures and has continuously supported that expansion up to our present time. The steam engine riding on rails made a significant contribution to that growth. These vehicles compounded the flexibility and power of military force.

Man's mastery of the vast water expanses of the globe with propeller-driven craft achieved an advance in maritime transportation capabilities also of revolutionary magnitude. It brought scheduled reliability to maritime commerce and set the stage for expansion of international commerce and trade, which is a dominant feature of the world's commerce and economy today.

In a military sense it at once removed the security of insular powers which they had formerly enjoyed behind their vast water barriers. It created a new technique for decisive military action against these insular powers—the technique of blockade or strangulation of the Island nation. It initiated a vigorous growth in naval forces by competing maritime powers. It made naval power effectively dominant in military action against an insular nation.

In the present century we have seen the inception and growth of another new and fully revolutionary vehicular system—the airplane. In the field of peaceful pursuit, the airplane has shrunk both time and space factors to a major degree. It has caused geographic boundaries between nations

to lose much of their former significance. Aircraft find it both difficult and impractical to stop and pay tribute to political boundary markers while en route to destinations deep within or beyond the boundaries of one nation. Aircraft have revolutionized the tempo of communications between widely separated peoples. Their range and speed have made it possible and practical for opposing nations to meet promptly at the conference table for the resolution of conflicting differences by negotiated procedure while the controversies are current—not hardened into inflexible values by extended delay in objective treatment. This capability for early and direct treatment of conflicting issues, if exploited, should and does constitute a strong deterrent to a resort to military warfare.

That there are forces at work today which are not objectively responsive to these facilities of modern air transportation and to the potential which they afford for the diplomatic and peaceful resolution of controversial issues, is now quite generally recognized.

It is recognition of this ominous feature of the present global conflict that motivates me to be objectively specific in treating with the magnitude of change in the basic features of armed conflict resulting from the introduction of air warfare as a new category of decisive military action. To describe air power in the orthodox military manner, as simply adding another category to the areas of decisive military action, is not sufficiently revealing to give a realistic definitive value to the magnitude of change in military potential resulting from the advent of this weapon system into the military field.

I advance, therefore, a personal diagnosis and evaluation of the significance and magnitude of change in military action resulting from the adoption of the airplane as a weapon in the family of offensive military arms.

A critical diagnosis of evolutionary trends in weapons systems shows a progressive growth in destructive capabilities which began with the club and stone age, followed by the spear, the crossbow, the bow and arrow, the rather elongated period of the gun barrel, the aerial bomb of World War II, and now the revolutionary nuclear bomb.

Concurrently a critical survey of military modes of transportation reveals evolutionary processes which carried forward from movement on foot, through animal-drawn vehicles, to mechanized vehicles both on land and sea, finally arriving at the current long-range jet-propelled aircraft capable of traveling at supersonic speed and delivering their firepower thousands of miles from their launching bases. Guided missiles, currently complementary weapons in the conduct of air warfare, will, with the support of a healthy technology, inevitably contribute further to expand weapon power potential. And this is progress, an essential feature of military worth.

Now let me couple these two dominant features in the destructive power trend of military weapons with a significant and alarming growth in the vulnerability of critical target systems. While weapons were expanding in power, evolutionary processes advanced civilization from the simple agrarian life, where mankind was widely dispersed and almost wholly self-sustaining to the highly concentrated and vital target systems of today—typified in our present densely populated industrial and transportation centers.

The current result of these historical

advances has placed modern civilization in double jeopardy: first, in the production of weapons of immense destructive power and the capacity to deliver that destructive power at ranges of thousands of miles; while, secondly, an expanding economy has created highly concentrated and profitable targets which are supervulnerable to these weapons. So vulnerable are these target systems to modern weapons that a modest force armed with modern bombs could, in a single operation, effect a far greater destruction against a target nation than was achieved in five years of intensive bombing against Germany during World War II.

Reasoning man, recognizing the destructive fire potential of these modern weapons, will find resort to war highly undesirable as a means for solving international controversies. If reasoning man sits at both sides of the conference table during the resolution of such differences, orthodox military action need not be feared.

If, however, one of the contestants at this conference table be adamant in his objectives and purpose, if he be unresponsive to a reasoned adjustment of issues—then the other member must be prepared for the ultimate in international controversy—either recession or resort to armed conflict. So long as such an eventuality remains as a realistic possibility, America should be prepared and ready to meet it.

In a sustained preparedness for the eventuality of decisive war, the paramount feature is rooted deeply in technological superiority in weapons and weapons systems. That superiority might be microscopic in dimension and yet provide the margin that insures survival. Range, speed, fire power, and base security will be the features that measure that margin of superior worth.

Some of today's jet-propelled aircraft greatly exceed the speed of sound —but the ultimate in speed will never be reached. The range of modern military aircraft is measured in thousands of miles—and will continue to expand. The current nuclear bombs far exceed in destructive power the primitive types that were used on Hiroshima and Nagasaki during the close of World War II. But current bombs will most certainly be outmoded by newer types. Base security will continuously demand improvement to meet the challenge of expanding enemy potential. These four basic features define a weapon's military worth —which will be measured in terms of its weakest feature. They all demand a healthy and dynamic technological focus if they are to remain superior to opposing force, if and when they are committed to combat.

While it is highly appropriate and laudable that Americans, today, both hope and pray for enduring peace, it is inappropriate and inexcusable that America be not prepared to her maximum capability for decisive war so long as a threat to our sustained security remains a realistic menace. To face that jeopardy acceptably, Americans all should be firmly conditioned mentally and fully ready militarily to commit our ultimate in military might to the preservation of our freedoms—our right to determine how we live. If, in the defense of our freedoms, a full-scale war be forced upon us, air power is the only military force that, today, can spearhead that commitment.

AIRMAN'S BIBLIOGRAPHY

With this issue we are initiating our book review section. It is intended that readers will be afforded reviews of the noteworthy additions to air literature as they appear. Publishers are invited to submit their new books to the Book Editor, though *The Air Power Historian* can only guarantee that such books will be considered for review. It is indeed gratifying to note the enormous strides recently made in the publishing of books dealing with air power. Thus, the book review section was designed to fill the requirement for helping students of air power separate the wheat from the chaff. We will continue to list outstanding periodical articles dealing with the historical aspects of air power.

THE CENTRAL BLUE, by Sir John Slessor. New York, Praeger, 1957. $7.50

In view of the nearly universal opinion that aviation is a subject of absorbing interest and flying a career of excitement and adventure, it is surprising how few good books have been written about it, especially autobiographical books, which ought to be the best. *The Central Blue*, the autobiography of Marshal of the Royal Air Force Sir John Slessor, is a notable exception and a delightful change from the generally mediocre outpourings of airmen. This is no surprise, of course, for Sir John has had not only a fascinating career spanning almost the entire history of aviation but he is also a talented writer, a good raconteur, with a fine command of language and the ability to make understandable to anyone who can read what is sometimes needlessly complicated by technical terminology or by too large doses of officialese.

The American edition of the book, which has followed the British original at the distance of about a year, is, so far as this reviewer could determine, word for word the same book, except for the insertion of a short foreword by General Carl Spaatz and an only scarcely longer Author's Note. In the latter, Sir John states that, as his book was written for British readers essentially, he would have liked to revise it for the American edition by cutting out some of the first six chapers. There may be some who will second this thought, but on the long view it is probably fortunate that this revision was not made. Autobiographies are the stuff out of which readable and authentic reflective history is written, and the participants in great events should not deprive the future historical writer of, or make it difficult for him to get at, all that they themselves found interesting and worthy of recording in penning their own stories.

It is in these early chapters that Sir John makes a real contribution to air historiography when he discusses at some length the early struggles of the Royal Air Force and the achievements and personality of the R.A.F.'s great leader, the late Viscount Trenchard. Slessor truly observes that Trenchard, to whom he affectionately and familiarly refers by the characteristic nickname "Boom," had nearly as large a following and almost as much popularity among American airmen as he had among British. A number of other writers, including the U. S. A. F. official historians, have been at pains in recent years to determine who were the really influential thinkers and doers who originated and developed the basic concepts on which the philosophy of air power of the present day were built. There have been parallels and comparisons drawn between the writings of Douhet and Mitchell but in all these analyses little has been said of Trenchard. Without any intention of arguing for such a conclusion, Slessor's narrative clearly hints that when the last word has been written on the subject it may be found that the dominant personality and influence on the development of the air power thesis in the first half century of the air age was, after all, Hugh Montague Trenchard.

A brief review of a very thick and meaty volume cannot hope to do justice to the author or his work. Some readers who know Slessor's other writings, *Air Power and Armies* (1936) and *Strategy for the West* (1954), and have heard his lectures at military schools in the United States and England, will perhaps not be able to rid their minds, in reading his life story, of certain of his pronouncements on the present and future applicability of air power to the world political situation with which they cannot agree. This is not the state of mind in which to study or appraise what is basically a historical narrative, full of movement, incident, personalities, and ideas, rather than a treatise on air doctrine. Aside from any value *The Central Blue* may have as an exposition of doctrine, and in this respect it is not to be dismissed lightly, it represents a major contribution to the history of the Second World War, the first air war of history, and particularly to the story of Anglo-American cooperation, a factor whose importance to the Allied victory cannot be overemphasized. In forging that cooperation Slessor was one of the principal actors, certainly the single most important Englishman in the field. From the early visits to England of Spaatz and other American observers and planners. Slessor seized not only upon the necessity of cooperation, personal and operational, but also on the spirit, the attitude of mind, which more than any directive or combined offensive plan was essential to make the coalition work. Slessor is the ideal historian of that great air labor in double harness because he was, if any man was, the star player on the team—in England, when he was A.C.A.S.(P), in the Mediterranean, when he was Deputy Commander of MAAF, under Eaker, and even after the war when at last, and so deservedly, he was elevated to be Chief of the Air Staff.

The Central Blue is a book of which it can be said that there is something good on literally every page. The purchase price would be well spent, for those who wish to see history in the making and understand its subtleties, to obtain Slessor's account of the visit to England at the time of Munich of Colonel Charles A. Lindbergh and to be enabled to read the memoir of his conversations with Lindbergh that Slessor wrote for the then C.A.S., Newall. There are other nuggets, including the author's thumb-nail portraits of the great and near-great whom he has known—the redoubtable Sir Winston Churchill, Portal, Tedder, Leigh-Mallory, F.D.R., Harry Hopkins, Arnold, Spaatz, Eaker. This is not to say that there is nothing more to be written on a subject when Sir John has disposed of it—the thinking of the Air Staff, R.A.F., on daylight bombardment, at the time of the Casablanca Conference, for example—but the author, even when his explanations of certain developments are transparently thin, is too frank, too fair-minded, too lacking in side, to convey the impression of imagining himself to be the last court of appeal.

Anyone who troubles to read this long book—and all who claim more than a passing interest in the history of air power must read it—will surely agree with the final sentence of General Spaatz's foreword: "None can fail to benefit from reading his trenchant comments and sharing the rich experience upon which they are based."—M. W. McF.

AIR POWER, by Asher Lee, New York: Praeger, 1956. $3.75

Any book by Asher Lee cannot fail to be of genuine interest to serious students of military history. The research and writings of this British author have earned an enviable reputation for him among a large and growing audience on this side of the Atlantic.

However, it is safe to predict that reader reaction to Mr. Lee's latest book, *Air Power,* will vary widely. Many will regard the book as indispensable to their understanding of the subject; some will sincerely feel that it is too limited in its scope; but all will agree that the author possesses exceptional research ability and singular erudition.

Mr. Lee, in handling his material, has indicated what he regards to be the most important aspects of air power. These are treated topically, by chapter, covering the following areas and in the sequence, as listed: Strategic Bombing; Air Attack on Communications; Air Defense; Reconnaissance; Parachute and Airborne Troops; Transport Aircraft; Supporting the Army; Naval Air Power; Combining the Services;

Air Intelligence; and The Future.

To a very considerable degree, the author draws upon World War II history for illustrative points in his discussion. It is obvious that he has relied heavily on the comprehensive research accomplished in connection with his previous volumes dealing with the German and Soviet Air Forces.

Every page is replete with historical examples of air power in action and it can be fairly stated that the book is a compendium of information ranging, in point of time, from World War I through the Korean conflict.

But the book presents more than a mere recording of air power as a military instrument. In it, the author's viewpoint is quite often apparent. A citation of a few selected examples of these personal expressions may well prove of interest. When reviewing the use of atomic weapons he states that their employment "has not changed the strategy of air power or of strategic bombing." He regards the A-bomb as actually just another end item in the arsenal of weapons and feels that it should only be regarded as unique in terms of the magnitude of its destructive power. The author decries emotional thinking so often associated with the atomic bomb and concludes that such a frame of reference "is not conducive to military analysis" (p. 21). In the same chapter, the statement is made that "Britain must retain a heavy bomber force, if she is to remain a major partner in the Atlantic coalition of nations" (p. 30). It is quite obvious that Mr. Lee is fully convinced that the British heavy bombers have inherited the *quondam* role of British seapower.

The author shows a strong predilection for establishment of supra service and even international controls to insure greater flexibility and improved direction of air power. He makes a strong plea for the organization of a Western Transport Command empowered to allocate and coordinate airlift requirements for all Allied members. When considering the question of command control, the author makes the statement that, "it is never possible for an air force alone to decide the best use of air power" (p. 158). This responsibility, he believes, can only be handled properly at the highest defense staff level. In terms of his background, it is only natural that Mr. Lee displays deep interest and keen insight into the past and potential contribution which intelligence can make to successful air operations. Here

Who Made the First USAF Kill in Korea?

Who shot down the first enemy aircraft in the Korean air war? Incidentally, this would also be the first kill of the new independent United States Air Force. Seven years have passed, yet little is known and even less has been written about this historic event. What American pilot clobbered the first Communist attacker on that forgotten first day? . . .

At about 0400 hours (Korean daylight saving time) on Sunday morning, June 25, 1950, the Communist North Korean Peoples Army initiated the Korean conflict by crossing the 38th Parallel. . . . Russian-built aircraft sustained this assault from the beginning, attacking American aircraft as well as South Korean targets. . . . The United Nations issued a cease-fire order on Sunday, and the United States began removing its citizens from the South Korean capital of Seoul and other threatened areas. . . . When not mounting top cover for the transports, Japan-based 5th AF fighters and Douglas B-26 light bombers were flying armed reconnaissance and surveillance missions as far up as the 38th Parallel, but with strict orders to *avoid* any provocative acts.

Tuesday, June 27, 1950, was a memorable day. The United Nations Security Council ordered military sanctions, and United States forces were ordered into police action. The removal of American nationals reached its peak, even as the U. S. Army began landing ground forces in friendly South Korea and the USAF established air superiority over the spreading combat zone. With cocky Communist pilots in the same sky, flushed with the success of their two-day-old blitz, it was inevitable that they start shooting. When our F-80 and F-82 pilots saw those little balls of fire begin coming past, they went to work and shot down seven or more North Korean aircraft that day. All were conventional, propeller-driven, Russian-built jobs, and none of our planes was lost or damaged.

Who was the first? A search of available records was made on several occasions, a year or more later, without establishing any positive proof. A strong probability did emerge, however: It seems most probable that credit for the first kill belongs to 1st Lt. William G. Hudson, piloting an F-82G-NA, number AF 46-383, of the 68th Fighter (AW)

again, the author recommends establishment of a unified intelligence corps organized above the level of those maintained by the individual military services. Also, from time to time, the fear is voiced that German technological skills will once again constitute a menace to world peace. Americans, in general, are understandably less apprehensive of this threat than Asher Lee and his British compatriots.

In his overall assessment of air power, the author identifies the human element as the greatest single deterrent to progress. Historically, it has too often been true that faulty judgment or misappraisal of an air weapon or its carrier has resulted in impairment of the ultimate in operational potential. All serious students of military affairs will recognize the grave dangers which stem from an inadequate appraisal of weapon capability. Although the problem can never be completely eliminated because of the finite capabilities of the human mind—much can be done to expand the parameters which govern conceptual thinking.

During recent years, much useful and valuable research has been accomplished in chronicling the past accomplishments of air power. It is hoped that increased emphasis will be given to stimulating creative thought and sound analytical writing dedicated to formulation of ever improving concepts for utilization of air power in keeping with the pace of technological advances and the imperative requirements of world conditions. Readers of Asher Lee will enthusiastically welcome a book along such lines.—Col. W. J. Smith, USAF.

AIR WAR AGAINST GERMANY AND ITALY, 1939-1943, by John Herington. [Australia in the War of 1939-1945; Series Three: Air, Volume III.] (Canberra, Australian War Memorial, 1954, pp. xvii, 731, 25s.)

This large volume is one of a projected twenty-two-volume history of Australia in the War of 1939-1945. The history is to be divided into five series, with a category for army, navy, air, civil, and medical services. The present volume is the sixth in the series to be published and is the first to appear of the four air volumes planned. All in all, the Australian historical project is a very formidable one, and both the authors and the Australian authorities are to be congratulated on their perseverance in an almost limitless task.

Squadron, that Tuesday morning, in the general area around Seoul and the Kimpo airfield. . . . Airmen and officers, mechanics and pilots alike, all seemed convinced that Lt. Hudson in this particular plane had made the first Korean kill, and apparently there were no conflicting claims at that time around the Itazuke Air Base. . . .

Seven alternate possibilities remain. Lt. Hudson sincerely believed that he actually had shot down the first Communist aircraft, but he suggested the possibility that a squadron mate, 1st Lt. Charles B. Moran, might have knocked down an LA-7 fighter moments earlier, instead of minutes later. . . . This was generally discounted, but in any event it would be difficult to prove conclusively, as Lt. Moran was reported missing in action on August 7, 1950.

Still another fine officer received some publicity for this honor several years later but, although he possibly could have fired the first shots from American guns in aerial combat, on the basis of available information it is doubtful that he made the first kill. Major James W. Little, commander of the 339th Fighter (AW) Squadron, was leading a flight of three F-82's over Korea that day. He destroyed one LA-7, while his wingmen, Lt. David H. Trexler and Lt. Walter C. Hayhurst, were each credited with a probable. The question of time remains. . . . A couple of months later, Major Little was transferred to the 68th Squadron on the same base, but at no time that year was he known to have questioned the claims of the 68th and Lt. Hudson for the honor. . . .

The complete story or final answer may never be known. Bill Hudson was promoted to Captain and was rotated back to the States some months later. A year afterwards there were few Air Force men left in the Far East who had taken part in those rough, exciting days of the old Pusan Perimeter, and fewer who cared. The immediate press of today's problems and tomorrow's plans drove out all thoughts of yesterday's incidents. It was a time for making history, not writing it. . . .

—*Excerpt from "First Korean Kill of the USAF," by Lt. Col. Boardman C. Reed, USAF, in the American Aviation Historical Society* Journal, *April-June 1957, p. 72 f.*

Mr. Herington's approach to the problem is an unusual one. He says in his preface: "The Australian contribution to air fighting against Germany and Italy consisted in the allocation of a large number of individuals for virtual incorporation within the Royal Air Force rather than the provision of self-sufficient units to work in co-operation with the major force."

The intention always was that these individuals would eventually be formed into Australian national units, but in the large majority of cases circumstances prevented the realization of this objective.

Herington tells us: "Apart from three regular units of the Royal Australian Air Force and seventeen temporary squadrons of that Force which served in Europe, Australian airmen were spread among more than 500 squadrons of the Royal Air Force."

This experience is of interest to Americans chiefly because it points up the danger that American airmen and smaller tactical units stood in, in the early days of our participation in the war (in North Africa, for instance), when the tendency of the Royal Air Force was to incorporate our flyers, aircraft, and all absorbable units into the larger and more thoroughly established R.A.F. units. The tendency was successfully resisted by American air commanders.

From the historian's standpoint it remains a curious fact that the very dispersion of Australians throughout the British forces provides the excuse or, better, *raison d'être,* for Mr. Herington's book. His history is not the history of the Australian experience *per se,* since that is not isolable. Rather Mr. Herington outlines the whole story of the air war in Europe, on the policy as well as the operational level, and gives us an Australian view of the over-all conduct of the air war. He of course does not leave out of account the exploits of Australian crews, but the essence of the book is the case study it presents of the integration of Dominion components within a British Commonwealth and Empire air force.

As such, this volume and its sisters will take their place in the history of the Commonwealth, and, as such, the effort put into them is justifiable. Mr. Herington has a note to the effect that he has been given full access to official documents but, from some omissions, one wonders if access was actually given to command and control documentation at the highest level.

—M. W. McF.

VISION—A SAGA OF THE SKY, by Harold Mansfield. Duell, Sloan and Pearce, New York. $5.00.

The art of personal biography, in the modern sense, is said to have originated with Dr. Samuel Johnson and *The Lives of the Poets,* a work reportedly undertaken at the behest of King George III who urged the author to execute "the literary biography" of his country. The art was carried to impressionistic, if not technical, perfection by Johnson's own biographer James Boswell, and the medium has fared more or less well ever since. Corporate biography, the writing of the life story of an institution or organization, such as an aircraft company or an airline, is by comparison so new and, because of the inherent problems of definition and identification, so difficult that few have essayed and fewer mastered it. Among the handful of masters Harold Mansfield must henceforth be reckoned.

Vision, A Saga of the Sky, is the biography of the Boeing Airplane Company, of Seattle and Wichita. It is a dynamic story about designing, producing, and flying some of the best airplanes that have been or, given the state of the science, ever will be built. The protagonists are machines—from the first B & W of Bill Boeing and Conrad Westerveldt in 1916 down through the all-metal *Monomail,* the pioneer transport 247, the XB-15, the 307 *Stratoliner,* the B-299 or B-17 *Flying Fortress* in all its manifestations, the B-29, the B-47, the B-50, the B-52 jet bomber, the 707 jet *Stratoliner,* and all that numerous family of which these are but the most conspicuous representatives. The coadjutors—co-actors, if you will—are the men, the midwives, who worried and struggled and sweated them into being. For the aviation enthusiast who must know his subject inside out, here is a book to absorb him; for the taxpayer and investor curious to learn what his dollars do for defense or for progress, this is a tally sheet; for the social scientist and historian who would

understand those importunate dronings in the sky that punctuate his quiet hours, this is an explanation that is also a revelation.

Harold Mansfield is a writer trained in journalism, with long experience at Boeing in public relations and advertising, of which he is now director. He is a young man but he has flown in all kinds of airplanes, from *Jennies* to jets. He has a wide acquaintance with the personalities who have made American aviation and who live in his pages. His method of writing appears to be that of the novelist rather than of the historian, and his product, while factual, is essentially a reconstruction of events based on interviews, the written record, and a final check by living participants. To give his narrative immediacy and achieve versimilitude he has emphasized a certain cast of characters, dramatis personae, who appear and reappear and become familiar as they would in fiction. This makes for a readable book though it somewhat distorts the real-life picture. Aware of this defect, Mr. Mansfield justifies the license in his foreword.

The author tells us that he has concerned himself more with engineering than with manufacturing and other phases of the story. Even so, he gets across the conflict between manufacturer and government that has colored so much of their relationship, whether in peace or in war, and has influenced so greatly the health of the industry and the defense of the nation. The most serious question posed in this book concerns the soundness or weakness of the procurement policies and research and development programs of the military services, the system of establishing requirements for equipment, and the contract procedures which are supposed to fulfill them. That and the re-echoing query whether or not the cycle of endless improvement that appears to characterize technical progress cannot somehow, some day, be made to apply to human relations on a world scale.

Vision is an attractive book, well put together, with a few, not enough, good pictures. It has interesting end papers showing, in five-year stages and common-scale drawings, the evolution of Boeing airplanes. The 8-page section of half tones is supplemented by black-and-white cuts of airplanes in the text which are repeated from the end papers. In-text cuts are a good device but these lack size and distinctness; they should have been bolder, starker on the page. The greatest flaw, however, is the lack of an index, which every non-fiction book should have, particularly books historical and factual in nature. The omission, a futile concession to "popularity," could betray the publisher's fear that a second reading would be out of the question.—M. W. McF.

Recent Books

Baba, Kazuo, (ed.), *Japanese Military Aircraft in the Pacific War,* 2 vols., Tokyo: Kanto-Sha Co., 1956, obtainable from Hampton Books, Hampton Bays, New York, $3.75. General reference only.

Brabazon, Lord, *The Brabazon Story,* London: W. Heinemann, 1956. Memoirs of Britain's waritime Minister of Transport, and a man active in British aviation from the beginning.

Brassey's Annual—1956, New York: Macmillan, 1956. Contains series of authoritative articles on current military affairs, including "Royal Air Force," "The Deterrent Force," "International Air Power," and "Guided Missiles."

Compton, Arthur Holly, *Atomic Quest: A Personal Narrative,* New York, Oxford University Press, 1956. The autobiography of a prominent scientist in the development of nuclear weapons.

Estep, Raymond, *An Air Power Bibliography,* Maxwell Air Force Base, Air University Research Studies Institute, 1956. Annotated listing of 3,151 books and articles.

Heflin, Woodford A., (ed.), *The United States Air Force Dictionary,* (D. Van Nostrand, $4.75). Commercial edition of official dictionary of 16,800 terms.

Herington, John, *Air War Against Germany and Italy, 1939-43,* (Australia in the War of 1939-45 Series), Canberra: Australian War Memorial, 1954. A detailed and well-written volume.

Joubert, Sir Philip, Air Chief Marshal, *The Third Service: The Story Behind the Royal Air Force,* London; Thames & Hudson, 1955. Reviews the entire history of the RAF in autobiographical fashion.

Maslund, John, and Radway, L., *Soldiers and Scholars: Military Education and National Policy,* Princeton University Press, 1957. A functional review of joint and service colleges.

Miller, John, Jr., et al., *Korea, 1951-53,* Washington: G.P.O., 1956. Official Army history of military operations.

Millis, Walter, *Arms and Men: A Study of Military History,* New York: Putnam, 1956. Examines the role of air power critically.

Preston, R. A., Wise, S. F., and Werner, H. O., *Men in Arms,* New York: Praeger, 1956. A general text book on the history of warfare, weak on air power.

Stewart, J. T., Col., *Air Power—The Decisive Force in Korea,* Van Nostrand, New York, 1957. A review of the use of air power in Korea, put out in conjunction with the Quarterly Review of the Air University.

The German Campaign in Russia—Planning and Operations, 1940-42, G.P.O., $1.25. U. S. Army historical study from German sources.

U. S. Congress (84th Cong., 2nd Sess.), *Civil Defense for National Survival* (House Report No. 2946, 24th Report of the Committee on Government Operations), Washington: G.P.O., July 1956. Comprehensive review with testimony on the national organization for civil defense.

Vagts, Alfred, *Defense and Diplomacy: The Soldier and the Conduct of Foreign Relations.* New York: King's Crown Press, 1956. A massive analysis of the interrelations between arms and policy.

Recent Articles

"Evolution of USAF Aircraft, 1907-1957," *Flying,* February 1957. A pictorial display.

Giffin, Sidney, Brig. Gen., USAF, "A New Future for World War II?" *World Politics,* January 1957. A review article.

Gladych, Michael, "Tupolev: Architect of Red Air Power," *Flying,* December 1956.

Greer, Thomas H., "Air Arm Doctrinal Roots, 1917-1918," *Military Affairs,* Winter 1956.

"How Red China Plots Against The U. S.," *U. S. News and World Report,* March 22, 1957. Question and answer interview with General Akio Doi, leader of the Japanese Military Group that visited Red China.

"Institute for Defense Analyses," *Fortune,* December 1956. Statement of the mission and purpose of I.D.A. (sponsored by M.I.T., Cal. Tech., Stanford, Case, and Tulane) to provide scientific judgment on the technical aspects of weapons and strategy.

Jonn, Knut, "Problems of Trans-Polar Operations," *Air World,* Vol. IX, No. 4, p. 90.

Leach, W. Barton, "The Central Blue," *Air Force,* February 1957. Review of Sir John Slessor's autobiography.

Lones, B. R., "How We Made Combat Pilots in 1917," *Flying,* February 1957.

Quarles, Donald A., "Our Main Purpose is to Prevent War," *U. S. Air Services,* October 1956; "The Use of Modern Arms," *Flying,* February 1957.

Russell, W. H., "Mahan's Doctrine and the Air Age," *Military Affairs,* Winter 1956.

Smith, Dale O., Brig. Gen., "FICON: Exciting Air Advance," *Pegasus,* May 1956, p. 6.

Smith, Dale O., Brig. Gen., "Supersonic Strategy," *Interavia,* January 1957.

Sunderman, James F., Capt., "The 'Silent Service' Speaks Up," *Air Force,* December 1956. Reviews mushrooming of writing and publication by airmen.

"The Bird and the Watcher," *Time,* April 1, 1957. Review of ICBM development.

Thompson, A. G., Maj., USAF, "South Pole Airlift," *Flying,* March 1957, p. 26.

Van de Velde, R. W., Col., "Make 'Em Proud," *Army,* March 1957. Short résumé on duties and responsibilities, as contrasted with privileges.

Williams, Eugene R., "The Impossible Happened," *Flying,* February 1957. Account of coast-to-coast nonstop flight in 1922 by Lts. Macready and Kelly of the U. S. Air Service.

Wilson, Gill Robb, "Concept: Key to Airpower," *Flying,* February 1957. Reviews the half century of U. S. military aviation in a comprehensive manner. Beautifully written.

Trenchard's Principles of Air Power

In May 1945, just at the close of the war in Europe, Marshal of the Royal Air Force, The Viscount Trenchard—the father of the RAF and one of the first proponents of strategic bombing—issued one of his characteristic little brochures in which, from time to time, he was accustomed to give to the world his thoughts on the progress of the struggle. In his brief foreword to this pamphlet, which he entitled, *The Principles of Air Power on War,* he said:

"I have endeavored to make plain in this pamphlet what part air power has played in victory over Germany, particularly in 1944-45, and to show how it has been based on the four great principles of air power.

"These four principles were conceived on the day the air was conquered. They have stood the stress of war to enable air power to save countless casualties both in the field and at sea. . . ."

Lord Trenchard's principles of air power, as he said, "were and are" the following:

"1. *To obtain mastery of the air,* and to keep it, which means continuously fighting for it.

"2. *To destroy the enemy's means of production and his communications in his own country,* that is by strategic bombing force.

"3. *To maintain the battle without any interference by the enemy,* which means to enable the commanders to build up the colossal supplies and reinforcements necessary for the battle, and to be able to maintain them without interruption by the enemy.

"4. *To prevent the enemy being able to maintain the battle,* that is, to prevent him being able to build up adequate supplies for his armies and navies or air force.

"The above principles were implicit in air power as used even in the war of 1914-18, but the technical means for their application were not then sufficiently developed to give air power the influence which it has exercised in 1939-45."

NEWS ITEMS

Air Force Golden Anniversary

The year 1957 marks the 50th anniversary of the United States Air Force. From its organizational origin as the Aeronautical Division of the Office of the Chief Signal Officer, U. S. Army, on August 1, 1907, the Air Force now passes a milestone in its life span of comparable significance to the place which it has come to occupy in the military structure and national life of the United States and in the power balance of the world. From that original directive of the War Department charging the Aeronautical Division with "all matters pertaining to military ballooning, air machines, and all kindred subjects," the mission of the Air Force has expanded into that of providing the decisive element on which the survival of this country and of much of the civilized world depends. The celebration of this anniversary is one that merits the active participation and support of all members of the Air Force Historical Foundation and of all Americans everywhere.

The Air Force has announced that it officially recognizes the Air Force Association as the sponsor of the Golden Anniversary celebration. The climax of the program will coincide with the 1957 annual AFA Convention, which will take place in Washington between July 30 and August 4. Thursday, August 1, has been specially designated Golden Anniversary Day and a full agenda of significant features will include the issuing by the U. S. Post Office of the special 50th anniversary stamp, the first Air Force stamp ever issued.

The following are the objectives for the Golden Anniversary celebration that have been developed mutually by the AFA and the USAF:

1. To salute the USAF—Guardian of Freedom;

2. To document the impact of the USAF on national progress;

3. To recognize the world-wide humanitarian and civic contributions of the USAF;

4. To stimulate public awareness of the needs of the Air Force, particularly personnel requirements, and assist the AF in recruiting and retaining qualified personnel;

5. To focus national attention on the impact of the Air Age and stimulate the interest of American youth in aviation as a career.

Debate and Discussion

The Editors invite readers to submit letters or short articles commenting upon statements of fact or inference made in *The Air Power Historian.* Many readers undoubtedly have footnotes to historical events which should be placed upon the record. With any living and thinking organization such as The Air Force Historical Foundation, discussion and debate upon vital historical questions is mandatory. To this end, the Editorial Board intends to print these letters which contribute to sound thought and healthy discussion within the bounds of reason and propriety. What have you to contribute?

Defense Studies Program

Members, and particularly professors and students of the AFROTC programs, may be interested to learn that we have in our possession a copy of the "Outline for Lectures on Air Power" given at Harvard University Graduate School of Public Administration by Professor W. Barton Leach. This outline is about 15 pages long, too lengthy to be reprinted here. However, if you are interested in developing such a program you may write to us requesting that we attempt to secure a copy of the "Outline," as well as the Bibliography for you, from Harvard University.

W. Barton Leach is a member of the Foundation and one of the foremost writers and lecturers on air power in this country today. He has written several articles for magazines.